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ADDRESSES AND ORIGINAL ARTICLES

THE CHILDHOOD TYPE OF TUBERCULOSIS*

BY LEONARD G. PARSONS, M.D., F.R.C.P. Lond.

PHYSICIAN TO THE CHILDREN'S AND GENERAL HOSPITALS, BIRMINGHAM; PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF BIRMINGHAM

THE childhood type of tuberculosis has been defined as "the diffuse and focal lesions in the lungs and adjacent tracheo-bronchial glands that result from the first infection of the pulmonary tissues by the tubercle bacillus," and in dealing with some of its aspects I hope to explain the apparent paradox that tuberculosis in early childhood may be both a benign and a fatal infection.

For many years it was held as an axiom in medicine that pulmonary tuberculosis in infants and young children was usually a fatal disease; in infancy, because of the rapidity of extension of caseous pneumonia and the liability to miliary tuberculosis; in childhood, because the disease is not limited to a portion of the lung by fibrosis—a process which is so characteristic of the adult type of tuberculosis—although with increasing age the child gradually develops the capacity to achieve this end. Therefore, at the one extreme of childhood there was the danger of rapidly spreading caseous broncho-pneumonia and miliary tuberculosis; at the other, the approach to the adult form of chronic pulmonary tuberculosis, and in the intermediate period the tendency to miliary tuberculosis and caseous broncho-pneumonia becoming progressively less marked. In this intermediate period the disease was regarded so seriously that, having made the diagnosis of pulmonary tuberculosis, the child's expectation of life could be measured roughly as one month for every year of its age—i.e., a child of six years had an expectation of life of only six months. This was the reason given to explain the fact that pulmonary tuberculosis is only a rare cause of chronic illness in childhood, and quite uncommon in children attending school.

Mode of Infection

The view that pulmonary tuberculosis was usually the result of inhalation of tubercle bacilli was widely held until some 25 years ago. About that time the importance of tuberculous milk in producing disease was realised, and the inhalation theory was contested so effectively by Calmette and others that in 1910 it was accepted that "air infection probably means that the bacillus enters through the mucous membrane of the throat or alimentary tract. Direct infection of the lungs is 'negligible'" (Cautley [1]). This "alimentary" view was based upon the important parts played in the tuberculosis of childhood by: first, the bovine infection of milk; secondly, the lymphatic glands. The disease appeared to arise in the lymph glands, since enlarged and caseous mesenteric glands were frequently found at autopsy or at operation and, which was even more important from the standpoint of this theory, caseous bronchial glands without any obvious lesion in the lungs were by no means an uncommon occurrence in autopsies. Infection of the bronchial glands and lungs via the alimentary tract and lymphatic system has been demonstrated experimentally, although a much larger dose of tubercle bacilli is required for infection by this route than by the air-passages. Anyone who has witnessed a post-mortem of, say, neuroblastoma of the suprarenals, will realise that the possibility of infection by this route cannot be denied; nevertheless, we can now say that the alimentary view of tuberculous infection of the bronchial glands is absolutely untenable, although infection of the lungs with bovine tubercle bacilli via the blood stream, which in its turn has been infected from an abdominal lesion, is a possibility, and actually does sometimes occur. Thus Blacklock [2] found the bovine bacillus in three instances in a series of 108 children under twelve years of age who suffered from thoracic tuberculosis.

The observations which eventually killed the alimentary theory were those published by Ghon in 1912, just at the time when the alimentary view was gaining so many adherents. Many years ago Cohnheim enunciated the law that the portal of entry of the tubercle bacillus was indicated by the fact that the lymph glands draining that area became infected, and it is now held that wherever tubercle bacilli first gain an entrance into the body a triad of changes takes place to which the name "primary complex" was given by Ranke; first, the primary tuberculous focus at the place where the bacilli lodge; secondly, a tuberculous lymphangitis spreading from the primary focus to the lymph glands draining that area; thirdly, inflammation and a tendency to caseation of these glands. Ghon showed that the primary lesion from which the bronchial glands became infected was situated in the lung, and that this primary focus was so small as frequently to be overlooked. In other words the infection was air-borne, and in his view 95 per cent. of tuberculosis occurred in this way. Such a conception explains the fact that tuberculous mediastinal glands may be found at autopsy without clinical or even obvious post-mortem signs of pulmonary tuberculosis. Ghon's work was unknown, or at any rate unaccepted, for many years; indeed, its importance has only been realised in recent times.

Epituberculosis

In the light of the doctrine that tuberculosis in early life is so fatal that, according to a leading British text-book of Children's Diseases published in 1929, "in the first year of life probably nearly all infected children die," [4] it is difficult to understand why the tuberculous process in the lung is ever limited to a Ghon's tubercle, and why the disease ever becomes arrested, but it is quite impossible to comprehend such a case as the following:

A male child suffered from cough and bronchitis from the fourth month of life, and at the age of 13 months was admitted to hospital. He remained in hospital 13 months. His general condition during this time was excellent, he put on 10 lb. in weight and on discharge was over the normal weight for his age. There was no dyspnœa and very little cough. He had both clinical and X ray evidence of consolidation of the upper part of the left lung, the extent of which was surprising in view of the boy's excellent condition. The lung was needled twice but no fluid obtained. The Mantoux intradermal test gave a markedly positive reaction. The sputum was examined for tubercle bacilli on two occasions, and the stools on no fewer than 13 occasions, but always with negative results. After he had been in hospital 10 months his fasting gastric juice was injected into a guinea-pig, and the animal subsequently developed tuberculosis. Two months later this procedure was repeated with a similar result. Considering that his general condition was so good, he was discharged from hospital when he was two

* An address delivered to the Sheffield Medico-Chirurgical Society.

years and two months old. Eighteen months later—that is, two and a half years after first being observed—a radiogram of his chest was reported as normal.

I submit that this case was proved to be a tuberculous infection of the lung of benign character, since during the whole time the boy was in hospital he was practically free from symptoms and made a complete recovery. I cannot see that Findlay [6] has any ground for the statement that in cases of this character

"tubercle bacilli are never detected in the sputum, so that there is always the possibility, in fact the strong probability, that the condition is not tuberculous at all. . . . In our experience lesions conforming to the above description have been slowly resolving simple pneumonia, which has come under observation after the crisis."

It is quite true that the shadow in the radiogram may closely resemble that cast by an alveolar pneumonia, but for myself I cannot conceive of such a pneumonic condition lasting for a period of months, or years, and then clearing without showing any clinical or radiographic signs of fibrosis.

The well-known French physician—Grancher—in the closing years of the nineteenth century showed that exudates in a tuberculous lung sometimes completely cleared up—a condition to which he gave the name spleno-pneumonia—but interest in this subject was not aroused until in 1920 and 1921 Eliasberg and Neuland [6] reported the occurrence, and 6 to 18 months later the complete resolution of lobar exudates in one or more lobes in infants who gave a markedly positive tuberculin test. Some of these infants had tuberculous lesions in glands and bones, but in all cases the pulmonary infiltrations found came as a surprise because of their extent and the good general condition of the child. The case I have detailed corresponds in every way with their description, except that positive evidence was obtained that tubercle bacilli were present in the stomach washing. They called these lesions "epituberculosis," regarding them as non-specific, non-tuberculous inflammations occurring around a tuberculous focus. This view was based upon the commonly accepted theory of the lethal nature of pulmonary tuberculosis in young infants, the argument running thus: such a degree of exudate if it were tuberculous must have an acute onset, must render the patient very ill, must go on to caseation, and must eventually cause death. Therefore, because these patients recovered the condition could not be tuberculous. "A generation born to a tradition of pessimism in the prognosis of extensive pulmonary tuberculosis confronted with the clinical facts of recovery, prefers to dispute the specificity of the regressive lesions" (Reichle [7]). A little later—namely, in 1923—Langer [8] reported the case of a child who had an exudate in the left upper lobe which in course of time completely disappeared but reappeared after the injection of 0·1 mg. of tuberculin. The recurrence of the shadow was accompanied by dullness and diminished breath sounds, all of which (including the shadow) cleared up within 14 days. Langer regarded this as proving first, that the original lesion was tuberculous and, secondly, that the change in the lung produced by the injection of tuberculin was a specific one. The conception of epituberculosis was therefore altered, and it was regarded as an allergic phenomenon, a non-tuberculous inflammation occurring round a tuberculous focus, in fact around a Ghon's tubercle; a conception which makes epituberculosis strictly comparable with the inflammation, œdema, and redness which surround the injected tuberculin in a positive Mantoux reaction. There is, however, this difference: the shadow in the lung produced by tuberculin, and the area of redness round the Mantoux reaction soon disappear, whereas the shadow cast by epituberculosis remains for months or even years. The explanation of the transient character of the inflammatory changes in a positive Mantoux reaction probably lies in the fact that the amount of antigen is only small and soon absorbed.

A BENIGN FORM OF PULMONARY TUBERCULOSIS

My introduction to epituberculosis was the result of a visit to Prof. E. Gorter's clinic at Leyden in 1926, when he described a typical instance in a girl of 3 years in whom an exploration of the lung, in the region of the interlobar (upper and middle lobes) fissure, resulted in the withdrawal of a small amount of material in the needle, which on examination was found to contain tubercle bacilli. The interpretation of this finding was that the needle had entered the Ghon's tubercle. Eighteen months later, although the lung condition had shown considerable improvement, the child died from tuberculous meningitis and, on the result of an autopsy, he came to the conclusion that from a small caseous focus which was found under the pleura at the junction of the middle and upper lobe there had spread what he described as a "collateral inflammation over the largest part of the upper lobe." [9] Attending the out-patient department of the Birmingham Children's Hospital is a child who has the typical radiographic appearances of epituberculosis, which are slowly clearing up and from whom, over a year ago, tubercle bacilli were obtained by needling the epituberculous area. The odds against the contents of a small Ghon's tubercle, the site of which there is no indication, being tapped in two children, must be very great, and these findings, together with those of Langer, are very suggestive that epituberculosis is a true tuberculous process. Moreover, even more convincing evidence has been obtained by Spence [10] in the following case:—

A boy, aged 7 months, old had typical signs of epituberculosis of the upper two-thirds of the left lung, which was explored when the child was 9 months old, tubercle bacilli being found in the needle contents. Four weeks later a second exploration was performed with the same result. On the first occasion the needle was inserted into the third inter-space in the axillary line, and on the second occasion it was inserted in the same space but in front in the mid-clavicular line and directed medially, so that the point of contact with the lung should be as far as possible removed from the site of the previous puncture. The child made a complete recovery, after an illness lasting some months, and the radiogram became normal.

We must agree with Spence that these findings placed the tuberculous nature of the process beyond doubt, and suggest that the whole lesion in epituberculosis is a tuberculous process. Spence indeed regarded the condition as a caseous tuberculous process, but I find it difficult to believe that the whole of the area could have been caseous and yet completely resolve.

The possibility that some caseous areas may heal completely must be admitted because Gardner [11] has shown by animal experiments that, by a process of resolution, caseation can be absorbed without leaving any trace of the original lesion. Further, Reichle [7] has found areas of caseous pneumonia showing giant cell formation contiguous with areas of infiltration which macroscopically were indistinguishable from ordinary broncho-pneumonia, and which microscopically showed simple inflammatory changes with numerous tubercle bacilli; in other words, the tubercle bacillus can produce a change which is in all

respects similar to that produced by other organisms and from which it is universally recognised that complete resolution may occur. In a child under our care who died from epituberculosis both these changes were found, although tubercle bacilli were not demonstrated in the areas of pulmonary catarrh.

This child, a girl, whose mother had advanced pulmonary tuberculosis, was admitted to hospital for wasting at the age of 14 months. Tuberculin skin tests were positive and examination of the chest revealed only scattered rhonchi and a few râles. Three months after admission she had a rise of temperature to 102°–104° F., and there were many râles and rhonchi scattered over the chest, and 10 days later dullness over the right upper lobe was elicited. Prior to her death some four months later, this lobe was needled seven times, and on one occasion only a small amount of blood-stained fluid was removed, which did not show tubercle bacilli. The fæces were twice and the gastric juice once examined for tubercle bacilli, but none was found. Occasionally there were ronchi and râles to be heard over other parts of the lungs. At the autopsy the right upper lobe was completely consolidated, showed many miliary tubercles and one or two small cavities. Miliary tubercles were scattered over both lungs. The mediastinal glands were caseous and one of these had ruptured into the right bronchus, the branches proceeding to the middle and lower lobes being almost occluded with caseous material. Microscopically, in the upper lobe, contiguous with areas showing caseation, endothelial cell infiltration with giant cell formation, and numerous tubercle bacilli, were found small areas of pulmonary catarrh in which the alveoli contained many large mononuclear cells and thickened interlobar septa.

Epituberculosis does not occur until the tissues have become allergic, but from the evidence which I have submitted it appears obvious that it should be regarded as a benign form of tuberculosis and not a pure allergic reaction; although for convenience I shall continue to refer to it as epituberculosis. It is difficult to assess the relative importance in epituberculosis of allergy and the presence of tubercle bacilli in the affected area, but it may be that the persistence of the shadow in the radiogram is due to the actual presence of the bacilli in the area whereas the more evanescent character of the exudates which follow injection of tuberculin are due to tissue allergy only.

Children suffering from epituberculosis react positively to tuberculin tests and frequently are known to have been in contact with adults suffering from pulmonary tuberculosis. The condition is usually characterised by mild constitutional symptoms such as slight fever, some cough, and loss of weight; nevertheless, all symptoms may be completely absent, and the child appear active, healthy, and putting on weight. On X ray examination there is found an extensive area of pulmonary consolidation occupying a great part, or the whole of one or more lobes, and sharply delineated. Frequently also there are only scanty physical signs, but there may be dullness and tubular breathing over this area. As may be gathered, epituberculosis is usually only discovered by radiographic examination, the results of which are strikingly at variance with the symptoms, and often with the physical signs. The course, which is every chronic, lasting months or years, usually ends in a complete recovery. The shadow in the radiogram gradually clears from the periphery, and as it does so a calcified nodule—the calcified Ghon's tubercle—may become obvious, or enlarged and calcified hilus glands may be recognised. Sometimes also there is left a well-marked thickening of the interlobar septum. This thickening is the result of a pleurisy, perhaps associated with the epituberculous process, but more probably produced by the primary tubercle of Ghon, which is frequently situated directly under the pleura and may lead to extensive involvement of it. Although the Ghon's tubercle may not be seen in the radiogram until the shadow of epituberculosis has disappeared, it is highly improbable that it is formed as the result of epituberculosis, because until a degree of allergy has been produced the tissue reaction producing such a lesion as epituberculosis cannot occur.

If the infecting dose of tubercle bacilli is not too large, the initial infection of the lung not only in childhood but at all ages may not produce any symptoms and is quite likely to pass unnoticed.[12,13] At this period, which has been called the primary tuberculous state, the tissue reaction is of the proliferative—epithelioid—type. If the lesion is a small one, complete recovery is possible either by absorption or rapid calcification. The lesion may, however, persist, leading to infection of the bronchial glands and occasionally—particularly if the infecting dose is a massive one—to a rapid generalisation of the disease. A few weeks after the original infection, except in cases of rapid generalisation, a high degree of allergy develops and the tuberculin tests become positive; at this stage if the original primary stage fails to heal, or if a further infection with tubercle bacilli takes place, a different type of tissue reaction—the exudative reaction—occurs. This is characterised by a rapid outpouring of serum and leucocytes, and may be sufficiently extensive to produce a shadow in the radiogram; thus a child who is known to have been exposed to infection develops a positive tuberculin reaction and shows enlargement of bronchial glands or shadows in the lung usually between the fourth and seventh week after exposure (Holt and McIntosh[14]). In this the secondary tuberculous state the symptoms are those already described as occurring in epituberculosis, and such manifestations as phlyctenular conjunctivitis, erythema nodosum, and pleurisy may also be encountered. Earlier in this address the childhood type of tuberculosis was defined as being the diffuse and focal lesions in the lungs and adjacent tracheo-bronchial glands, which result from the first infection of the pulmonary tissues by the tubercle bacillus; a definition which it is therefore quite obvious covers epituberculosis.

Ghon's Tubercle

The actual results produced by this primary infection of the lungs depend almost certainly upon the size of the infecting dose. With minimal doses of tubercle bacilli it is perhaps possible for complete recovery to occur without involvement of the bronchial glands. In mild degrees of infection a Ghon's tubercle probably develops with involvement of the bronchial glands, and possibly the latter may occur even without the formation of the primary tubercle. If the infection is rather more severe a definite Ghon's tubercle is formed, the glands become infected, and after a few weeks, when a degree of allergy has developed, a severe inflammation develops around the primary focus—a perifocal pneumonia—which if it is of any extent produces the phenomena of epituberculosis. This eventually clears, and even the Ghon's tubercle may heal. A pleural effusion may occur, due to an associated pleurisy. If the infection is of an even greater degree of severity the perifocal pneumonia may progress to necrosis caseation, or cavity formation. If not too extensive these lesions may eventually heal by fibrosis or calcification, but although, on the basis of radiographic examination, healing after cavity formation has been reported by Gerstenberger and Burghans[15] and others, in my opinion this is extremely improbable and the cases

reported are not beyond criticism. If the primary infection is overwhelming in character a massive caseous pneumonia with cavitation may occur.

From the Ghon's focus or the caseous lung or bronchial glands the blood may become infected and either a miliary tuberculosis result or tuberculous lesions develop elsewhere, depending on the degree of infection of the blood. Sometimes at autopsy miliary tuberculosis is found with only a minute Ghon's focus and not very large caseous bronchial glands, suggesting that the child had not put up any fight, and blood infection and generalisation had occurred shortly after the primary infection. It is usually assumed that bone and joint tuberculosis in children is chiefly due to the bovine bacillus, but Griffith's [16] statistics show that in England in children under five, almost three-quarters, and in children over five, more than four-fifths, of the cases are due to human tubercle bacilli: in Scotland, on the other hand, these figures were respectively two-fifths and three-fifths—i.e., bovine infection predominates.

The Ghon's tubercle varies in size from that of a millet seed to that of a greengage plum. In one-third of the cases in his series Ghon found the lesion to be the size of a pea. It is situated at the periphery of the lung parenchyma, and in 90 per cent. of cases is directly subpleural, the organisms having lodged in the smallest bronchioles. Caseation, and sometimes in the largest foci cavitation, occurs; in smaller ones there may be a degree of healing as shown by attempts at capsulisation and even calcification. Adhesive pleurisy is also present in quite half the cases. The small Ghon's tubercle may be difficult to find and require a diligent search; indeed, it is often better to harden the lung in some fixing fluid before it is cut. Ghon himself frequently had great difficulty in finding the primary focus, and often missed it after hours of searching, "only to find it at a subsequent time and on further tireless examination." Sometimes there is more than one focus and Ghon found this in 16 per cent. of his cases. The distribution according to lobes of the primary focus in Ghon's series, and as judged radiographically by Stoloff [17] in Vienna, is shown in the accompanying table (Table I.).

TABLE I

		Ghon.	Stoloff.
Right lung	Upper lobe	72	118
	Middle lobe	19	69
	Lower lobe	48	167
Left lung	Upper lobe	59	71
	Lower lobe	44	99

Before leaving this aspect of the tuberculosis of childhood, I wish to make it quite clear that resolving shadows in the lungs of children suffering from pulmonary tuberculosis or of those showing positive skin tests may be due to at least two other causes—namely, pneumonia and atelectasis. The differentiation between epituberculosis and pneumonia has already been given, and it may be distinguished from atelectasis by the following features. The shadow of epituberculosis usually occurs in an area which is not involved by atelectasis—for instance, in the central area of the lung. In atelectasis the radiographic appearances differ from epituberculosis in that the atelectatic area is smaller in size and retracted towards the hilum, the heart and superior mediastinum are dislocated, and there is elevation of the diaphragm on the affected side. The shadow of epituberculosis clears slowly from the periphery, a form of clearing which would not occur in atelectasis. Atelectasis may occur from pressure of enlarged glands on a big bronchus, and Stoloff [18] has reported the occurrence of massive collapse of the lung as the result of a primary tuberculous complex, but in this case the lung expanded again within a period of four days. Again, Morlock and Scott Pinchin [19] have recently described an instance of atelectasis of the right upper lobe in a boy aged fourteen years, which gave a radiogram like epituberculosis and which disappeared after bronchoscopy. By bronchoscopy a tumour was seen passing into the lumen of the right bronchus, part of which was removed and showed typical tuberculous granulation tissue. Two weeks later the shadow reappeared, and three weeks later again the shadow once more was absent. In these respects the shadow differed from that seen in epituberculosis, the characteristic of which is its persistence for a long period.

Results of Reinfection

To complete the survey of the natural history of pulmonary tuberculosis in childhood the effect of reinfection must be considered. Reinfection may take place from without—a fresh infection—or from within. Auto-reinfection may occur in several ways: (1) by a direct spread from the root glands; (2) by dissemination in the blood stream from a tuberculous focus producing miliary or larger conglomerate lesions; (3) by the erosion of bronchus by a caseous gland producing massive infection of the area it supplies, with widespread dissemination by the bronchi to other parts of the lung and also to the opposite lung. It is clear that if infection occurs by either of the two latter methods a fatal result is certain should miliary tuberculosis develop, and almost certain otherwise. The prognosis when reinfection by extension from hilar glands or from without depends on the power of the child to localise the lesion. The older the child, the more likely is localisation to occur and chronic tuberculosis of the adult type to develop. It is, therefore, obvious that the child has to be under observation for some time before a definite prognosis can be given; nevertheless, the condition is always serious, and the younger the child the more likely is the disease to progress rapidly to a fatal termination either by extension throughout the lung or as the result of miliary tuberculosis. When this power of localisation has been evolved the condition has been called the "tertiary tuberculous state" and is due to the development of a degree of immunity as a result of recovery from either the primary or the secondary state. The development of hypersensitiveness has nothing to do with immunity, indeed Rich [20] has shown that active immunity can be produced without the development of allergy; further, Sabin [21] having produced in animals a high degree of tissue allergy to tuberculo-protein by sensitising them with the purified protein of tuberculin, injected tubercle bacilli into their lungs and found that they were more, not less, susceptible to infection—a state of affairs exactly comparable with reinfection in the young child.

From this review it is therefore, I think, proved that tuberculosis of the childhood type is in some degree very frequent, and, particularly after the period of infancy has been passed, is probably often benign in character. Various estimates, such as 50 to 100 per cent., have been formed as to its mortality in infancy, but even the lower figure is probably too high. The statement has also been made that in the second and third year infection is very common, but symptoms of the disease rare. It is probable that even in infancy benign cases do occur, but massive infections are more likely in their period than in later life, and

hence the greater mortality. In view of the frequency of these benign infections are we to fold our hands and say that nothing remains to be done except to try to prevent reinfection? God forbid. This benign disease may be fraught with the most serious consequences—namely, tuberculous meningitis—and it is to this phase of the problem that I would now direct attention.

Tuberculous Meningitis

It may be argued that tuberculous meningitis, although always fatal, is not really a menace worthy of consideration because the total number of cases is small. I want, however, to make it clear that the condition is by no means rare. In the Birmingham Children's Hospital, from Jan. 1st, 1932, until Sept. 30th, 1933, a period of 21 months, there have been no fewer than 60 cases of tuberculous meningitis; 33 of these having occurred in the first 9 months of the year 1933. The remarks that follow apply to the Birmingham area, since there is evidence to show that bovine infection is more frequent in Scotland, although it should also be remembered that in other countries infection with the human bacillus plays an even greater part than in England.

Through the kindness of my colleague R. J. Gittins, pathologist to the Children's Hospital, I am able to quote the results of the post-mortem examinations of 671 children under 12 years of age. These autopsies were performed in a period of less than 3 years, and out of that number in 100 cases death was due to tuberculosis, chiefly tuberculous meningitis. The distribution of the lesions found in these cases is shown in Table II. In the earlier autopsies an intensive search for Ghon's tubercle was not carried out, otherwise the percentages under this head would have been higher, and they are considerably higher in autopsies carried out during the last year. For the purpose of comparison, the number of fatal cases of clinical broncho-pneumonia have also been calculated, and over a rather longer period of time these form an almost identical percentage of autopsies. In our hospital records, therefore, nearly one-third of all deaths are due to tuberculosis and pneumonia, and these rank equal as the two most killing diseases of infancy and childhood.

TABLE II.—*Fatal Tuberculosis in Childhood*

In a series of 671 autopsies tuberculosis was the cause of death in 100 (14·9 per cent.). The most advanced lesions in these cases were situated as follows:—

Tracheo-bronchial glands	71
Mesenteric glands	18
Cervical glands	1
Doubtful	6
Caseating glands not found ..	4

Seventy-one cases were examined for Ghon's tubercle and this was present in 49 (70 per cent.): right lung, 28; left lung, 21.

Ten children (1·5 per cent.) who died from other conditions showed tuberculous lesions at autopsy.

Another of my colleagues, A. V. Neale, has investigated the histories of 300 children under 12 years of age, who died from tuberculosis in the Birmingham Children's Hospital and a small general hospital in the same area during the years 1920–1933. In 68 of the children it was known at the time of their admission to hospital that they had been in contact with adults suffering from open pulmonary tuberculosis, and of these children 63 had primary thoracic and only two primary abdominal lesions. In three instances the infection appeared to be generalised from the onset. Through the kindness of the local public health authority visits were paid to the homes of 47 of the children in whom a history of contact could not be obtained at the time of their admission to hospital, with the result that open tuberculosis was found in adults—in most instances the father—who had access to 22 of these children. Two hundred and four of the children were under the age of 3 years, and 66 occurred in infants at the breast. Of these infants 23 were known to have been in contact with an adult suffering from open pulmonary tuberculosis. The infecting source was usually one of the parents, and, oddly enough, even in these breast-fed children, the father (13 cases) was more frequently the culprit. The reason for this is probably that a mother suffering from open pulmonary tuberculosis is rarely able to bear the strain of lactation; subsidiary causes may be the facts that women usually swallow their sputum and that fathers in the lower classes not infrequently are guilty of promiscuous expectoration.

MENINGITIS

These investigations showed that the youngest member of the family, especially if an infant, was the most likely to be infected, and they clearly indicated that the problem of preventing tuberculous meningitis in infants is that of preventing their infection with the human bacilli. The focus from which the blood stream is infected with human tubercle bacilli is either the Ghon's tubercle—rarely some other focus in the lungs—or breaking down mediastinal glands. Bovine infection cannot by any means be ruled out as a source of meningitis, because Griffith [16] has shown that bovine tubercle bacilli were found in the meningitis of more than one-third of a series of 52 children under the age of 14 living in England who died from tuberculous meningitis.

ITS PREVENTION

The prevention of tuberculous meningitis of bovine origin is a comparatively easy matter, and can be achieved by the furnishing of a safe milk-supply, a condition of affairs which would eliminate primary abdominal tuberculosis. According to estimates made by the Ministry of Health 7 per cent. of the milk supplied to large towns contains tubercle bacilli. The milk-supply can be rendered safe either by the production of tubercle-free milk or by destruction of the bacilli by pasteurisation, sterilisation, or drying the milk. The former is, of course, the better method, but it is the more expensive and difficult to carry out. Certified and Grade A (T.T.) milk may usually be accepted as free from tubercle bacilli, although there are certain loopholes in their production which suggest that even milk of this high standard is not always absolutely safe. Nevertheless, it is probable that an absolutely tubercle-free herd, and therefore tubercle-free milk, can be obtained if a herd of non-reactors is used for breeding purposes and cattle from outside sources are never introduced. An experiment which gives support to the preceding statement has recently been carried out for the Medical Research Council by Jordan in Ayrshire.[22] This experiment, which extended over three years, was concerned with an area nine miles square, and included about 30 herds. Each herd was divided into two groups and, when possible, the reactors were housed in separate buildings; if not, the reactors and non-reactors were housed at different ends of the barns and care taken to prevent cross-infection. They were grazed in separate fields, had separate water-supply, and infection from manure

was guarded against. The non-reactors were recruited from young non-infected stock, mostly bred by the owners themselves and each herd was re-tested at six-monthly intervals. The reactors were sold in the open market. At the end of three years 20 herds were free from tuberculosis, whereas at the commencement of the experiment only eight were free.

Alternatively, tubercle bacilli can be killed by efficient pasteurisation, and in many towns in Canada and the United States, where such pasteurisation is compulsory, abdominal tuberculosis is a clinical curiosity. I have visited many pædiatric clinics in these two countries and can add my personal testimony to the truth of that statement. Furthermore, pasteurisation possibly, nay probably, provides an answer to the criticism implied in the question: Is not the ingestion of tubercle bacilli of great value in developing immunity in the child? The answer is in the affirmative, if only the dosage could be controlled, and this fact is, of course, the basis of the B C G method of immunisation of young children. Pasteurised milk almost certainly contains the toxins of the tubercle bacillus, and these probably are of value in producing immunity, whereas if certified milk is given immunity does not follow. The only real drawbacks to pasteurisation of milk are: first, that it may not be efficient; and, secondly, that as a rule butter is made and cream obtained from unpasteurised sources. Unless the milk is held at 145° to 150° F. for 30 minutes, the process is possibly more harmful than if the milk were not heated at all. It is of the greatest importance that the temperature recording apparatus, and all the other apparatus used in pasteurisation, should be absolutely reliable, and if there is any doubt about the efficiency of the process, the only safe method is to boil the milk or use a good brand of dried or condensed milk.

The elimination of tuberculous meningitis of human origin is a much more difficult task, since it consists in removal of all possibility of infection by tubercle bacilli of the human type. Many instances of tuberculous meningitis which come under my notice occur in homes in which one of the inmates has an unsuspected open pulmonary tuberculosis, or a known sufferer from that condition has failed to carry out the necessary precautions. It has been truly said that "there is more than one way of telling whether or not an adult has an open tuberculous lesion: one can find the bacilli in his sputum, or one can find the infection in his baby" (Park). The first thing in attempting to deal with this scourge is a closer examination of contacts, and especially when these are young children. In a family in which open tuberculosis is present the sufferer and the young children should be separated completely, or, if that is impossible, contact should be reduced to a minimum, and the most rigid precautions taken in regard to disposal of sputum. Careful examination of the children should be undertaken from time to time and such an examination should include the performance of the intradermal tuberculin test and a radiographic examination of the chest, both antero-posteriorly and obliquely. By this means I am sure many more cases showing exudative lesions, such as I have described, will be discovered; indeed, Armand-Delille and Lestocquoy[23] state that 50 per cent. of all pulmonary tuberculosis between the age of 5 and 10 years is of this type. I am far from convinced that this work of the examination of contacts is being carried out as efficiently as it should be, and the fault probably is not entirely that of the tuberculosis service. It is probable that none of us who has patients suffering from pulmonary tuberculosis can be entirely exonerated. Often the patient himself creates difficulties, and does with right remind us that his home is his castle and not ours. Yet, in spite of all this, I believe that more could be done in this direction by the tuberculosis service, and that there could be more coöperation between that service and the patient's doctor. I have stressed this point because contact examination is the key to the solution of this problem.

Difficult as is the problem of efficient examination of contacts, that of dealing with the children who give positive tuberculin reaction and show exudative changes in the lungs is even more difficult. There is no question that the ideal course is to remove such a child from its surroundings, or to remove the source of infection from the house, although such a counsel of perfection can rarely be carried into effect. In Toronto these children are sent to a preventorium, a branch of the children's hospital, and, of course, in France they are removed from their homes and dealt with under the Grancher system, although no child is accepted in the Grancher homes if there are any clinical or radiological signs of tuberculosis. Children who can be removed from their homes should not be sent to a sanatorium unless it is one which only admits children, and in which there is rigid isolation of children with open pulmonary tuberculosis. In spite of all that is with truth claimed for sanatoria, there is in my opinion a chance that children may contract reinfections in them if for no other reason than that patients sometimes break rules; furthermore, many sanatoria are even less fitted to care for children than general hospitals. Unfortunately there are few preventoria in England for these children, and their provision offers a great opportunity for enlightened municipal enterprise. We have attempted to deal with the fringe of the problem at our hospital by sending a few of these children to our Swiss branch at Davos for a prolonged stay, but more accommodation is urgently required. When neither the children nor the infecting adult can be removed from the home the greatest care should be taken in dealing with sputum, and the contact between the children and the adult should be reduced to a minimum. The children should receive a generous diet, rich in vitamins, and be in the open air as much as possible. They should also have regular rest periods, and if there is any degree of pyrexia should be completely in bed, if possible in the open air. Finally, every care should be taken to prevent the occurrence of respiratory catarrhs because of the liability of these catarrhs to develop into pneumonia, which is such a serious complication.

Conclusion

My survey of the childhood type of tuberculosis is now finished, and no one is more conscious than myself of its inadequacy, nevertheless I trust that I have been able to convince you that tuberculosis in infancy and early childhood is often a benign infection of frequent occurrence having a good prognosis, but that this benign infection is capable of developing into perhaps the most terrible illness of childhood, before which we are absolutely helpless; moreover, it is frequently impossible to say of any given case that this dread complication will not occur. If I have conveyed to your mind something of the horror which tuberculous meningitis inspires in me, and of the ravages of a disease which carries off far too many of the fairest and brightest children in all ranks of society, your time and mine will not have been wasted. It will not have been wasted because we shall have made up our minds to do our share to

prevent its occurrence by insisting in season and out of season on the carrying out by ourselves and by others of a rigid examination of contacts, and by educating public opinion to demand a safe milk-supply, and proper provision for the isolation and treatment of infected children. To finish on a note of sadness would, however, be quite unjustified because if there is one thing above all others that recent work on tuberculosis has shown, it is that the outlook for infants and young children infected with tuberculosis is vastly better than 15 years ago we could ever have imagined possible.

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OLIGURIA AND ALBUMINURIA IN BRIGHT'S DISEASE

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THE conception of diminished urination in Bright's disease as an impaired capacity of the diseased kidneys to eliminate fluid is at once so simple and direct, and so much in accordance with many of the more easily observed clinical facts, that it has in the past been widely entertained and still forms the basis of many systems of treatment. It would appear, however, that never since Cohnheim[1] has retention of fluid by the affected organs been universally acknowledged as the primary and paramount cause of oliguria in œdematous nephritis of all kinds. While the reasons for this are numerous, and some appear very cogent, it is proposed here to deal with one only, and that is the paradoxical nature of the lesions which frequently exist in the kidneys of cases where oliguria has been a pronounced and enduring feature.

It has long been known that in many cases of subacute nephritis with obstinate œdema and oliguria the most obvious morbid changes in the kidney affect the tubular epithelium and are degenerative in nature, while the glomeruli seem little affected or even normal. As the latter are universally accepted as the eliminators of fluid, this anatomical substrate has usually been regarded as inadequate to account for diminution of the urinary flow, and for this and other reasons the cause of the oliguria in such cases has been sought in various occurrences outside the kidneys themselves. For a time a partial elucidation of this difficult problem appeared to be promised by the development of the conception of nephrosis (Munk,[2] Volhard and Fahr[3]) as a disease clinically and pathologically identifiable from subacute glomerulonephritis and possibly as a general metabolic disorder in which the kidney was only secondarily affected (Epstein,[4] Löwenthal[5]). According to this view, which has been especially promoted in this country by Bennett,[6] the oliguria of diffuse glomerulonephritis might be at any rate partly renal in origin, but in nephrosis the primary occurrence affecting distribution of fluid was œdema, and the prerenal deviation of fluid in this form resulted in the kidney having less to excrete, hence the oliguria. Apart, however, from the natural objection that this process alone could hardly be expected to maintain oliguria indefinitely after the reserves of space in the body were filled with fluid, it soon came to be recognised, partly on clinical and partly on pathological grounds, that a clean-cut separation of nephrosis from nephritis was difficult if not impossible. This has been acknowledged in the later appearance of the term "Nephritis mit nephrotischem Einschlag" (Fahr[7]) and the fact has been fully documented by Leiter,[8] who has shown that by no single feature or group of features can the most genuine nephrosis be distinguished during life from a disease which proves histologically to be subacute glomerulonephritis.

The later reactions on this impasse have been very diverse on the part of different authorities. Thus there are some, who in the main neglecting the possible significance of renal structural change in relation to the signs and symptoms, have still maintained nephrosis as an entity; while some have even considered that in nephritis of nephrotic type the now somewhat ill-defined syndrome of nephrosis is a something superimposed on the nephritis (Murphy and Warfield[9]). As representative of an opposing view may be mentioned Gainsborough[10] who has concluded that the invention of a new name has failed to embody a distinct condition and that the problem of subdivision of subacute nephritis is still unsolved.

The closer study of the renal histology in nephrotic cases which has accompanied more intensive clinical and biochemical investigations does not yet appear to have shed definite light on the situation. It has certainly been noted by experienced workers (Fahr,[11] Bell,[12] Gray[13]) that even in the cases of nephrosis, where the lesions at first sight appear most exclusively tubular, the glomeruli always show some morbid alterations. Unlike, however, the changes in glomerulonephritis, it is clear that these have frequently not been of such a kind as would occasion a diminution of blood flow, or hence, presumably of glomerular filtration, so that it has still seemed impossible to explain the very similar symptoms that may be observed in glomerulonephritis on the one hand and in nephrosis on the other by reference to a common cause in the renal lesions. In a recent article (Shaw Dunn[14]) the view was provisionally advanced that a common principle for renal retention of fluid in all œdematous oliguric nephritides might be arrived at on the basis of the modern theory of renal functionation (Cushny[15]) and that oliguria, according to that hypothesis, would most probably depend on excessive reabsorption by the renal tubules

from a glomerular filtrate which might be originally normal in amount. Such an explanation would adapt itself especially readily to the peculiar phenomena of nephrosis, where sodium chloride, which is relatively abundant in the blood, is retained along with water, while urea which is scanty in the blood is readily concentrated and eliminated. A suggestion was then made as to how imbalance of reabsorption might arise in diffuse glomerulonephritis where there is clearly a limitation of reserve of the glomerular circulation, but no concrete idea could be formulated to account for a similar disturbance in nephrosis with the capillaries of the tufts uniformly

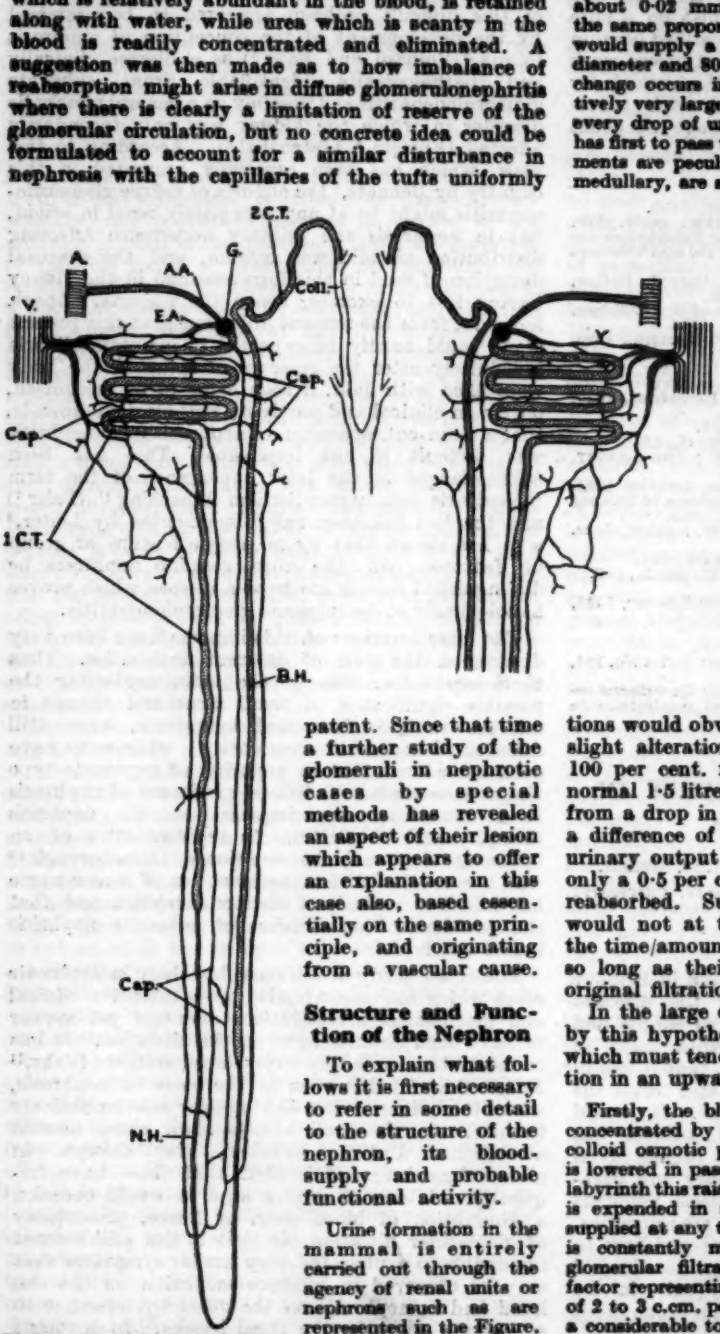

Diagram of nephrons in rabbit's kidney drawn approximately to scale from Huber's measurements of an actual structure. A. = Artery. V. = Vein. A.A., E.A. = Afferent and efferent arterioles. G. = Glomerulus. Cap. = Capillaries. 1 C.T., 2 C.T. = Convoluted tubules. N.H., B.H. = Narrow and broad limbs of Henle's loop. Coll. = Collecting tubule. (× 20.)

patent. Since that time a further study of the glomeruli in nephrotic cases by special methods has revealed an aspect of their lesion which appears to offer an explanation in this case also, based essentially on the same principle, and originating from a vascular cause.

Structure and Function of the Nephron

To explain what follows it is first necessary to refer in some detail to the structure of the nephron, its blood-supply and probable functional activity.

Urine formation in the mammal is entirely carried out through the agency of renal units or nephrons such as are represented in the Figure. This diagram is based on the drawing and measurements of an actual average nephron from a rabbit's kidney by Huber.[16] The coiled mass of almost nude capillaries forming the glomerulus is a relatively small structure measuring in this animal 0·1 to 0·125 mm. in diameter, while the secretory part of the tubule passing from it is very long, 24 mm., and narrow, 0·05 or 0·06 mm. in external diameter; the internal diameter is variable, but even in diuresis may be only about 0·02 mm. (Brodie and Mackenzie[17]). Observing the same proportions a glomerulus 4 or 5 in. in diameter would supply a tubule of not more than an inch internal diameter and 80 ft. in length. The surface at which interchange occurs in the concentration of urine is thus relatively very large, and it is important to keep in mind that every drop of urine that escapes to the collecting tubules has first to pass through such units. The vascular arrangements are peculiar in that the tubules, both cortical and medullary, are supplied exclusively with blood which has first passed through glomeruli (Huber[16]) and given up more or less filtrate. The capillary network around the tubules is abundant and anastomoses freely, so that there can be no question of the efferent arteriole from one tuft supplying only its own tubule.

According to the modern theory the whole of the process of extrusion of excretory products from the blood occurs by filtration of protein-free plasma under pressure from the tufts and this is concentrated in the tubules by reabsorption of almost all the water along with threshold bodies while only purely excretory products and useless excess of threshold materials remain in the formed urine. The amount of urine may represent only about a hundredth part of the original filtrate, ninety-nine parts having been taken back, so that the large variations of urinary output which can occur under natural conditions would obviously be most easily accounted for by slight alterations in the proportion reabsorbed. A 100 per cent. rise in daily output of urine from a normal 1·5 litres to a polyuria of 3 litres would result from a drop in reabsorption from 99 to 98 per cent., a difference of only 1 per cent. Similarly a fall in urinary output to one-half the normal would entail only a 0·5 per cent. increase in the amount of filtrate reabsorbed. Such variations in urinary output would not at the same time involve alterations in the time/amounts of excretory substances eliminated so long as their titre in the plasma and the rate of original filtration did not vary.

In the large exchanges of fluid which are involved by this hypothesis certain factors can be recognised which must tend to influence the amount of reabsorption in an upward or downward direction.

Firstly, the blood supplying the tubules, having been concentrated by loss of the filtrate, has acquired a raised colloid osmotic pressure: when the hydrostatic pressure is lowered in passage to the wide capillary network of the labyrinth this raised oncotic pressure provides energy which is expended in again taking up fluid. The force thus supplied at any time is no doubt of a low potential but it is constantly maintained so long as blood flow and glomerular filtration continue; when multiplied by a factor representing the large volume of renal blood flow of 2 to 3 c.cm. per gramme per minute, it must amount to a considerable total in the course of a day, during which period only a relatively small volume of fluid is elaborated as urine. Since this is work which is done by the circulation it is so much which is not done by any special vital activity of the renal cells. It may be remarked that in respect of outward passage of fluid from capillaries where the blood pressure is higher and the recall of it by the osmotic pressure of the plasma colloids where the hydrostatic pressure is lower, the above scheme is identical with that which was formulated by Starling[13] to account for

nutritional irrigation of tissues from the capillaries and for lymph formation. From a consideration of the phylogeny of nephridia there is nothing very fanciful in the conception of renal excretion as a specialised modification of the formation of lymph; it is a conception which would exercise the same mechanism in the regulation of blood volume, as in what has been called by F. C. McLean [19] the regulation of body volume, so far as this is carried out by the kidney.

A second factor that can be recognised, this time working in the opposite direction, is the amount of urea and other excretory crystalloids in the lumina of the tubules. It is readily apparent that, while all other tissues in the body are freely permeable to urea, the cells of the renal tubules, and for that matter the epithelium of the whole urinary tract, are when normal relatively impermeable to it in a direction from lumen to blood stream. On no other consideration would it be possible to obtain the high concentrations of urea that may be found in normal urine. As has been shown (Dunn, Haworth, and Jones,[10] Dunn and Jones [21]), when the first convoluted renal tubules are injured by soluble oxalates while the circulation remains intact, the concentrating power of the kidney fails, and urea is retained in the blood. Later experiments, unpublished, have revealed the same effect in nephritis produced by uranium, cantharidin, and mercuric chloride, where also the first convoluted tubules are selectively damaged; the phenomenon occurs even with slight degrees of epithelial injury, and not only, as Gray [22] has assumed, when they are completely necrosed; if the damage is severe anuria results, presumably because the necrosed tubules have lost all capacity to regulate the passage of fluid and the latter finds its only escape from the kidney via the blood stream. In uric acid nephritis also (Dunn and Polson [23]), where the first convoluted tubules escape injury but the ascending limbs of Henle's loops and the second convoluted tubules are affected, exactly the same retention of urea with temporary oliguria or anuria is observed; the intactness of these lower segments is obviously as essential to a maintained concentration of urea as is a healthy state of the upper, apparently more highly specialised ones.

Since then urea is normally held in the lumina of the tubules it cannot but exert its physical osmotic property by holding back water from reabsorption through the cells into the blood. It is essentially on the basis of this view that the diuretic effect of medicinal doses of urea is usually explained, and there is no reason to doubt that the lesser amounts present naturally in the filtrate act functionally in the same way. When we remember the great length of the tubules it seems not at all unlikely that but for this normal diuretic action of urea the whole of the filtrate would always be reabsorbed, leaving nothing for excretion.

The Balance of Nephron Activity

It is not suggested that these two antagonised factors are the only ones which bear on the normal regulation of urinary volume, but it appears probable that in any scheme involving much filtration and reabsorption they must from their constant activity play a very large part in this; accordingly a very exact correlation of their action must be necessary in order to ensure that neither too little nor too much reabsorption occurs to suit the needs of the organism for fluid balance—in other words, that the correct volume of urine is eliminated.

In attempting to visualise a process whereby the above correlation could be upset as a result of glomerular disease, so as to produce excessive reabsorption of water and salt, without at the same time having diminished glomerular filtration, and therefore retention of urea, it has occurred to me that an explanation might be found in a disturbance of the normal alternation of glomerular, and therefore of nephron activity.

The view that the glomeruli are not continuously in action, but that they open up and close down intermittently has been firmly established for the kidney of the frog by the remarkable pioneer work of Richards and Schmidt.[24] They observed under the microscope not only alternating action of capillaries in the same tuft, but also temporary cessation of blood flow in whole tufts for unequal periods. In mammals direct examination of the tufts in action has so far proved impossible, but the experimental results of Khanolkhar [25] and of Hayman and Starr [26] in rabbits using indirect methods of intra-vital injection give good grounds for the belief that this is a universal process in the kidneys of higher animals as well.

Seeing that such an alternating action of the glomerular capillaries would only bring them into line with what is known of these vessels in other tissues where they can be directly observed during life (Krogh [27]), I will assume it to be a fact and will consider the effect that it may have on the activities of the nephrons.

The rate and degree of intermittent action of the tufts in man cannot be projected, but if we assume for the sake of clearness the extreme condition of one glomerulus out of three being open at a time, then we may regard a group of three adjacent nephrons as representing fractionally the whole activity of the kidney. We will then recognise that during any period the filtrate from the glomerular blood is passing to only one tubule to be concentrated, and that the process of reabsorption is aided only by the blood in the capillaries around that tubule; acting in the opposite direction we have the osmotic power of all the urea in that amount of filtrate. If now we assume for contrast that all three glomeruli are open at once, but that the total renal blood flow is unaltered, we will then have each tuft working continuously, but each with only one-third of the blood which formerly passed through one, and we will have three tubules each receiving one-third of the filtrate and urea which formerly went to one. Thus the same total amount of filtrate will be subjected to reabsorption over an area three times as large as before, and with the aid of the same raised oncotic pressure of blood proteins as before, but greater in extent because the capillary area around three tubules is in action. Against these factors tending to increase reabsorption we will have in the same period only the same total amount of urea as before, divided to three tubules, tending to hold fluid in the lumina. There will thus in the latter case be a liability for less fluid to remain in the tubule for excretion—in other words an oliguria, but with normal elimination of urea. As has been stated, the case taken as normal is the extreme one of cessation of activity of two out of three nephrons at a time, but with a less strict degree of alternation the same principles would hold good.

Disturbance of Glomerular Function in Nephrosis

In the application of the theoretical considerations set out above to the interpretation of the phenomena of human disease, it has already been suggested[14] that in diffuse glomerulonephritis the changes in the glomerular capillaries, which are partly blocked by thickened endothelium, would account for interference with the intermittent action of the tufts and so bring about the disturbance of balance already outlined. In this disease there is frequently no doubt a considerable degree of obstruction to blood flow in all the tufts, and a rise of blood pressure commonly results; the view is hardly tenable, however, that oliguria is in this case due to diminished total blood flow and lessened glomerular filtration, for in many

instances oliguria and œdema are present while elimination of urea is still only slightly, if at all, impaired. To explain this state of affairs, if renal blood flow were much diminished, it would be necessary to assume that the diseased kidney was able to separate urea from the blood at a better rate than the normal one.

The condition of the glomeruli in nephrosis has always appeared to negative any possibility of an explanation of oliguria based on a change in the capillary vessels. Fahr's [11] account of them mentions slight general hyalinisation or thickening of capillary basement membranes but with maintenance of the lumina, wide and often empty of blood. Slight increase of endothelium may occur, and some cells may show fatty degeneration, but stigmata that might be of inflammatory origin are very slight, and there is often no histological grounds for assuming any obstruction to blood flow. In agreement with this, as is well known, the blood pressure in such cases is normal and hypertrophy of the heart does not occur. The continuance of a normal blood flow is also indicated by the absence of rise of blood-urea over long periods while oliguria and œdema continue.

The further suggestion to be made as to the significance of the glomerular changes here is based on the results of staining the capillary basement membranes by Mallory's connective tissue method.

This reveals the fact, not apparent by ordinary staining, that in addition to the slight diffuse thickening of basement membrane, there is a fixed patency of the capillary lumina in all the tufts, whether empty or blood-filled, in contrast with the conditions in normal kidneys where these exhibit all varying degrees of collapse or distension and a distended state is usually accounted for by the presence of red blood corpuscles. The ends of the arterioles in the tufts are also usually more widely patent than normally. The state of fixed patency of the capillary lumina is similar in general aspect to what has been described and figured by Baird and Shaw Dunn [26] in the nephritis of pregnancy and eclampsia, which is classified by some as a nephrosis.

The interpretation which it is proposed to place on this appearance is that from its constancy and diffuseness it is a significant change, and that it is an indication of abolition of the normal rhythmical contractility of the capillaries, whether that property belongs to their whole length or only to their arterial ends. In some instances the flaw has probably resulted from mild antecedent glomerulitis, seeing that minute adhesions occur as well on many of the tufts; in other cases definite signs of old glomerulitis are lacking, but it is not meantime considered that an inflammatory origin is ruled out. So far as function is concerned, the condition appears to provide a basis for unbalanced over-reabsorption of glomerular filtrate on the lines already indicated, with resulting oliguria. As the blood pressure in these cases has been normal, there is no reason to suppose that the arterial distribution to the kidneys as a whole has been different from normal, so that the permanent patency of the glomeruli would not mean an increased perfusion of the kidneys but only a permanently uniform distribution of the available blood.

ALBUMINURIA

The heavy and continuous escape of protein in the urine in nephrosis has often been considered almost as difficult to account for as the oliguria, by reference to the renal lesion. The view that this protein is eliminated because it is abnormal and not because of disease in the kidney (Epstein,[29] Thomas, Schlegel, and Andrews [30]) has not found confirmation, and with the support of Hewitt's [31] polarimetric analyses the majority of workers seem to regard it simply as serum protein, accounting thus for the low level of the plasma colloids. It is also generally believed to come direct from the glomeruli rather than the tubules, and the greatness of the loss is supposed to depend upon an abnormal permeability of the capillary walls (Fahr,[11] Gray [13]), though this is not easy to account for. It is, in fact, difficult to suggest any analogy in disease elsewhere in the body for an escape of a high concentration of protein from the capillaries which lasts so long and which is associated with such slight alterations in these vessels as we find in the glomeruli of nephrosis. The implications of the modern theory of excretion are again of particular importance in this connexion.

If we accept that urine is concentrated by reabsorption of, say, 99 per cent. of the glomerular filtrate we must recognise that a high albuminuria, say 2·5 per cent., can only result from the escape of a quite low titre, 0·025 per cent. of protein from the tufts, unless there is very active reabsorption of protein by the tubules. That the percentage of protein in the original glomerular filtrate must be low is also indicated by the great volume of the renal blood flow; at a moderate estimate this will normally amount in the human subject to between 800 and 900 litres per day, and as has been pointed out, in nephrosis with normal elimination of urea it is probably little if at all reduced. At this rate of flow an albuminuria of 20 g. per day would be accounted for by a loss of not more than 0·025 g. of protein from every litre of blood passing through the kidneys. Even with the plasma proteins reduced to one-half of their normal concentration this represents a very slow rate of leakage of protein from the capillaries; in the large volume of filtrate demanded by the modern theory the original percentage of protein may indeed be no greater than that which is found in the œdema fluids of this disease. Histological examination also, so far as it goes, would support the view that the protein content of glomerular filtrate is low and that concentration occurs in the tubules; albuminous deposit is rarely abundant in the capsular spaces while on the other hand solid casts are commonly seen in the lower tubule segments.

To account for this continuous slight loss of protein from the glomerular capillaries reference is made again to the interpretation of their functional condition which has been outlined above. The suggestion has been made that in all the tufts these vessels are permanently open, and that each tuft is being continuously perfused, but at a much less rate than is normal for an active tuft. This amounts to a permanent state of stasis with slight dilatation, a condition which, according to Krogh,[27] invariably results in the escape of more or less plasma protein from capillaries whose walls are otherwise normal. This explanation of the albuminuria of nephrosis has already been put forward by Govaertz and Cordier [28] as an alternative to a continuous action of some toxic agent, and it seems to fit the known facts much better than the latter hypothesis. The high level of the albuminuria at first sight, no doubt, seems to imply a severe damage of the vessels, but if such were present could the condition be expected to persist unchanged for so long as it does? The albuminuria of nephrosis may endure for many months, and at the end the glomerular changes are often only of the mild character already described. The suggestion given here attributes the high *percentage* of the albumin in the urine to the process of concentration by reabsorption of fluid in the tubules; its large daily *amount* is explained by a slight but constant deduction from the large volume of blood which passes through the kidneys in the day, and it refers the *escape of protein* from the glomerular capillaries to a more or less mechanical occurrence, the validity of which in other situations has not been

doubted. It also makes no further assumptions regarding the structural and functional changes in the tufts than those which have already been made to account for the oliguria.

TUBULAR CHANGES

In this attempt to explain these cardinal phenomena of nephrosis, oliguria, and albuminuria, on the basis of changes that can be seen in the tufts only, it may appear that the well-known tubular lesions have been forgotten. The appearances of fatty and lipoid deposit, of hyaline droplet change, and of foamy swelling, are certainly often prominent in old-standing cases, but as Mayrs [33] has pointed out there is no evidence that the presence of these abnormalities interferes at all with one of the highest known functions of the tubule cells, that of concentrating urea, so that these cannot be supposed to be seriously degenerated. As has already been suggested by Aschoff [34] and by Govaertz and Cordier,[32] the presence of these abnormal substances in the cells may well be due to their having been reabsorbed from the filtrate in the tubules; hyaline droplet change is probably a reabsorbed protein, while the lipoidæmia always present in these cases will account for the large lipoid deposits sometimes seen. The prominent tubular appearances of nephrosis would, therefore, be accounted for, like the oliguria and the albuminuria, by the essential and primary lesion in the glomeruli.

Application to Other Forms of Nephritis

The view which has been presented of the interrelationship of structural change with renal functional disturbance has here been propounded almost solely in its bearing on the phenomena of nephrosis, but it is considered that the same principles would apply to the elucidation of those signs and symptoms which are shared with nephrosis by other forms of Bright's disease. On this basis it would become possible to comprehend the great clinical similarity of pure "tubular" nephritis or nephrosis to glomerulonephritis of nephrotic type, at a time when the latter has not yet revealed its true nature by a rise of blood pressure or the development of urea retention. In nephritis of pregnancy, where oliguria, œdema, and albuminuria are often accompanied by good urea excretion, it is now known (Fahr,[35] Bell,[36] Baird and Shaw Dunn [28]) that a slight but diffuse glomerular lesion exists which sometimes resembles that of nephrosis and sometimes a mild intracapillary glomerulitis; tubular changes, if present, are qualitatively the same as in nephrosis.

Amyloid disease of the kidney is occasionally associated with a clinical picture indistinguishable from that of nephrosis (Volhard [37]), and here we have, no doubt, as the primary pathological development an alteration of the glomerular capillary walls which may well interfere with their functional activities, while the tubular changes are again the same as in nephrosis or subacute glomerulonephritis.

In the promulgation of a theory which would account for oliguria and albuminuria in all œdematous nephritis purely on the basis of renal morbid histology and physiology, it is obviously impossible at the present time to submit completely verified facts in support of every contention, and in what has been written above resort has frequently been made to what are regarded as theoretical probabilities. The main assumption that has been made, and by it the argument stands or falls, is the correctness of the filtration-reabsorption hypothesis of urine formation. Exactly how this theory stands nowadays it is difficult to assess; many physiologists appear to accept it wholly or in part, and while a complete scientific proof that it is the sole basis of urine formation in mammals is hard to secure, the work of A. N. Richards and his collaborators,[38 39] has gone far towards a direct demonstration of its truth in animals with accessible glomeruli. So far as the present communication is concerned, the matter may be viewed in another light. It is a reasonable presumption in pathology that in disease an organ performs its function in a manner as nearly normal as the interfering factors will allow, and does not proceed to act on some entirely different principle. A theory of normal functionation which cannot be fully established is thus submitted to test when it is applied to the elucidation of the abnormal physiology associated with disorder of structure. In this respect it does not appear too much to say that the secretory theory of renal activity, involving glomerular filtration of only the amount of fluid which appears as urine, has been tried and has failed to provide a common type of cause for oliguria which may be combined with good urea concentration. If the logical application of the modern theory will provide such a principle it will be so much in confirmation of the validity of that hypothesis.

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ST. GEORGE'S HOSPITAL.—In 1933 in-patients totalled 5238, of whom 427 were children under 12. Their average stay was 20·26 days, and 20·74 per cent. of them were sent on discharge to Atkinson Morley's Convalescent Hospital. The weekly cost per patient was £4 10*s.* 4*d.*, an increase of 2*s.* 4*d.* There were 36,827 out-patients who cost a fraction over 7*s.* 6*d.* each. At £82,518 the ordinary expenditure showed a deficit of £84; the bank overdraft was £35,517.

SPINAL ANÆSTHESIA*

BY H. K. ASHWORTH, M.B. Manch.

VISITING ANÆSTHETIST, MANCHESTER ROYAL INFIRMARY AND ANCOATS HOSPITAL

AT the present time the majority of anæsthetists in England probably use one of the following drugs or preparations of drugs: Stovaine, Duracaine, Spinocain, Percaine, and Novocain crystals dissolved in cerebro-spinal fluid.

The ideal drug (as yet non-existent) for subarachnoid nerve-block:—

(1) Should be slightly lighter than the cerebro-spinal fluid, and this relationship should remain constant as long as the drug is active;
(2) Should have a high degree of local action on, and be rapidly "fixed" by, the nerve-roots;
(3) Should have a slow rate of blood absorption;
(4) Should be easily administered and easily controllable;
(5) Should maintain its anæsthetic effect for as long a time as is required.

None of the five preparations mentioned fulfil all of these criteria, and when such a drug is invented many of the existing difficulties of subarachnoid block will disappear.

Stovaine is the oldest of the preparations in common use, and for many cases is still pre-eminent. It has the advantage, first, that the manipulative technique required for a successful administration is small, since an adequate dose is contained in a small volume of solution and it requires little or no mixing with the cerebro-spinal fluid. Moreover, Barker's solution is considerably heavier than cerebro-spinal fluid and gravitational diffusion is all that is needed to obtain the required height of anæsthesia. Secondly, stovaine has the merit of being rapidly "fixed" by the nerve-roots, so that it is perfectly safe to place a patient in full Trendelenburg position 15 minutes after injection, without fear of any upward spread which might paralyse the anterior roots of the phrenic nerves. The one possible disadvantage of stovaine is that its action is transient, and anæsthesia in the upper abdomen rarely lasts for longer than 45 minutes.

Spinocain enjoyed a great vogue a few years ago but is now becoming increasingly discredited. It is an alcoholic preparation of novocain with a specific gravity slightly less than that of the cerebro-spinal fluid. Owing to the greater rapidity of absorption of its more volatile alcoholic constituents, the relation between its specific gravity and that of the cerebro-spinal fluid becomes a variable and unknown quantity after injection, with the result that neither accuracy of the anæsthetic level nor certainty of fixation can be obtained.

Duracaine is a somewhat similar solution but heavier than the cerebro-spinal fluid and without the strychnine present in spinocain. Novocain solutions are claimed by their users to be less toxic than stovaine or percaine. Doubtless this claim may be substantiated in the experimental laboratory, but it does not hold good in clinical practice. Novocain, because of its weaker anæsthetic properties, has less affinity for nerve-roots than its much stronger rivals and this lack of affinity is in itself a source of two possible dangers. First, it is difficult, if not impossible, accurately to gauge the time in which such solutions are fixed and the patient may safely be placed in the Trendelenburg position without fear of phrenic paralysis. Secondly, the novocain which is not taken up from the cerebro-spinal fluid by the nerve-roots passes into the blood stream, and as a large dose of this comparatively weak anæsthetic agent is commonly injected in the process of spinal anæsthesia, the amount absorbed from the blood is by no means negligible.

Percaine.—The nearest approach to the ideal drug for spinal anæsthesia at present known is probably the 1 in 1500 solution of percaine in 0·5 per cent. saline. Percaine is slightly lighter than the cerebro-spinal fluid and this relationship remains constant so long as the drug is active. The one disadvantage is that the large volume of the required injection increases the margin for manipulative errors during administration. Percaine has the great merit of permitting accurate dosage, using the method described by Howard Jones. With the patient in the lateral flexed posture, the spine is measured in inches from the vertebra prominens to the spot at which it is crossed by a line joining the highest point of the iliac crests. From this measurement a subtraction is made of 4 for a man, 6 for a woman, and 7 for a child of 8–10 years of age. The resulting number, expressed in c.cm. of percaine solution, represents the dosage which should be injected at the level of the second or third lumbar interspace in order to obtain anæsthesia extending as high as the fifth dorsal nerve-roots. This is the level required for full abdominal anæsthesia. The formula works in practice, and it is found that the height of anæsthesia always lies between the third and fifth dorsal nerve-roots. For subumbilical surgery there is no need to measure the patient, and 10–12 c.cm. will always suffice to provide anæsthesia for such operations as prostatectomy, hysterectomy, or herniotomy. Another advantage of percaine is that it is the only spinal anæsthetic which can safely be given and the patient then left upon a flat table or trolley, provided that the ventral decubitus is adopted; there is no fear of the anæsthetic spreading either too high or not high enough. Much time can often be saved by administering a spinal anæsthetic in the anæsthetic room instead of waiting until the operating-table has been vacated by the previous patient.

THE CHOICE OF DRUG

I should, however, like to suggest that every patient should receive the preparation most suitable for the condition and operative need of that particular case, and not simply a routine dose of the anæsthetist's pet preparation. This statement does not imply that an anæsthetist should use a different preparation for every subarachnoid block, and thus risk failing to obtain a thorough technical and physiological understanding of any drug. For example, Barker's stovaine Billon cannot, in safe dosage, be guaranteed to maintain upper abdominal anæsthesia for more than 45 minutes. It seems to me for this very reason to be the best existing drug to use for subarachnoid block in urgent abdominal surgery if a spinal anæsthetic is required. Most urgent abdominal operations should be, and usually are, performed within this space of time, and by using stovaine with its comparatively transient effect the patient is, from the anæsthetic standpoint, restored to physiological normality as soon as possible after the operation is completed. Among examples of the benefits often conferred by this procedure may be mentioned:—

1. There is less risk of respiratory complications, since the lower intercostal muscles are paralysed by the anæsthetic for a minimum period of time.
2. The patient may be nursed immediately in the most favourable surgical position indicated, without reference to the anæsthetic.
3. He may immediately, if surgically indicated, take fluids by the mouth. Or again, Barker's solution, with its

* Read before the Liverpool Society of Anæsthetists.

specific gravity of 1025, drops immediately into the sacral recess if injected into the subarachnoid space with the patient sitting upright, thus providing an excellent, localised, and adequately long "saddle area" anæsthesia, ideal for such operations as hæmorrhoidectomy or cure of fistula-in-ano.

Conversely, percaine solutions, which will maintain abdominal anæsthesia for two hours, are obviously more suitable than stovaine for an operation such as resection of the colon but as obviously unsuited for the performance of hæmorrhoidectomy. My own practice is to use either percaine or stovaine, according to the needs of the case, basing my choice on the lines indicated above, and I do feel that, when a spinal anæsthetic is decided upon, the anæsthetist should think a step further than a mere routine dose of any single drug.

CONTRA-INDICATIONS

There are five absolute contra-indications to subarachnoid nerve block. They are: (1) organic disease of the nervous system, e.g., disseminated sclerosis, meningitis; (2) recognised mental abnormality; (3) pyæmia; (4) septic disease in the route of injection, e.g., cellulitis of the back; and (5) operation above the diaphragm. Relative contra-indications are:—

1. Deformity of the spine in which intrathecal puncture is difficult or impossible.

2. Low pre-operative blood pressure. This often provides one of the most difficult problems which are presented to an anæsthetist. It is impossible to fix an arbitrary low-level limit, and every case must be judged individually.

3. Very young or highly strung patients should not be subjected to spinal anæsthesia unless their consciousness can be both adequately and safely damped down by suitable pre-operative medication; in this connexion the words "adequately" and "safely" are, unfortunately, not often compatible.

4. The presence of any disease which is associated with a great depletion of the blood volume. Abdominal hæmorrhages and acute intestinal obstruction are in this category although, paradoxically, intestinal obstruction provides one of the greatest indications for spinal anæsthesia. The apparent paradox can be resolved by pointing out that, whereas in cases of acute intestinal obstruction the blood volume can be safely increased by the intravenous administration of at least 2 pints of normal saline solution before operation, the same procedure cannot be carried out safely in the presence of uncontrolled hæmorrhage.

5. The performance of any operation which involves violent or noisy procedures which are likely to be very disturbing to a conscious patient. Many orthopædic operations fall within this category.

6. Any operation in which a large degree of surgical shock is probable.

7. Operations on the kidney. The lateral kidney posture is an extremely unpleasant one for a conscious patient; any difficulty in delivery of the upper pole often causes pain owing to the involvement of the diaphragm, and the bridge hinders the circulation by preventing a free return of blood via the inferior vena cava and thus increases the risk of any fall in blood pressure.

INDICATIONS

The three absolute indications are: (1) The presence of serious disease of the respiratory system, e.g., phthisis or bronchitis. (2) Acute intestinal obstruction with distension. In these cases the operative facility provided by spinal anæsthesia outweighs the often grave risk of the slight additional fall of blood pressure in an already collapsed patient. (3) For lumbar sympathectomy. Besides providing the perfect muscular relaxation necessary for this operation, spinal anæsthesia provides a valuable prognostic guide as to whether operation is likely to result in permanent improvement in the circulation in the legs.

The relative indications for spinal anæsthesia are probably the most controversial of any, and the following list represents purely personal opinions:—

1. Urgent abdominal surgery in adults, with the exception of that necessitated by hæmorrhage or associated with extremely low blood pressure. In addition to the benefit conferred on the surgeon by providing him with the greatest possible amount of muscular relaxation when most he needs it, the patient has finished receiving all harmful anæsthetic effects within a few minutes of the end of the operation, and has no extra strain to bear of the post-operative excretion and sequelæ associated with general anæsthesia.

2. Genito-urinary surgery, and particularly prostatectomy, but excluding, as a rule, operation on the kidneys unless renal function is so poor that excretion of a general anæsthetic might be a dangerous post-operative strain.

3. The presence of metabolic diseases, e.g., diabetes mellitus, or damage to excretory organs, e.g., cirrhosis of the liver, Bright's disease.

4. The presence of cardiac disease, with the exception of aortic incompetence.

5. The rare patient who dreads unconsciousness during operation more than consciousness.

6. Long operations in which muscular relaxation is essential and in which, therefore, the patient would otherwise need a lot of ether, thus adding to the harmful stimuli received. As examples of this class of case may be mentioned gastrectomy, resection of the colon, and abdomino-perineal resection of the rectum.

7. The type of patient who would be difficult to control or adequately to relax under a general anæsthetic, i.e., cases in which the amount of general anæsthetic required would be disproportionately great in comparison to the operation to be performed. The commonest examples are the professional footballer with an internal derangement of the knee-joint, the policeman with hæmorrhoids, or the publican with a fractured patella. In such cases spinal anæsthesia relieves the anæsthetist from what often used to be a very damaging and exhausting struggle during induction.

8. Amputation of the leg, provided that due precautions are taken to prevent the patient from being aware of the sawing of bone.

9. Herniotomy. In addition to providing an easy and safe anæsthetic for the radical cure of hernia, spinal anæsthesia diminishes the risk of the post-operative cough which is particularly undesirable in such cases.

PREMEDICATION AND "COMBINED" ANÆSTHESIA

Consciousness is undoubtedly the greatest disadvantage of spinal anæsthesia. Many attempts have been made to overcome this by varieties of premedication. A small dose of a basal narcotic combined with spinal anæsthesia promised to be an ideal combination from the point of view of both patient and surgeon.

It has been found, however, that such a combination is too dangerous to be used in other than very exceptional cases. All preliminary narcotic drugs (except in very small doses) enhance the danger of central respiratory failure or fall in blood pressure under spinal anæsthesia. My own procedure is to limit preliminary narcotics to the administration of morphia gr. ¼ forty minutes

before operation. This is accompanied by ephedrine grs. 1¼, and I would stress the importance of administering ephedrine not less than twenty minutes before the time for the spinal injection. The object of this injection is to combat the fall in blood pressure caused by spinal anæsthesia. The technique commonly used is to administer a subcutaneous injection of ephedrine in novocain solution at the site and time of the lumbar puncture. This procedure is useless, as the subsequent subarachnoid injection paralyses the vasoconstrictors long before the ephedrine has had any chance to be absorbed from the subcutaneous tissue and exert its specific effects.

For "combined" anæsthesia gas-and-oxygen is certainly the best, but very light chloroform anæsthesia is preferable to ether, as the "midwifery" type of anæsthesia will suffice. True combined anæsthesia means that in which the inhalation anæsthesia is given purely to abolish consciousness, and not the disaster which sometimes occurs in everyone's practice of a "failed" spinal anæsthetic. Unfortunately, and for some entirely inexplicable reason, a patient with a "failed spinal" always requires far more general anæsthetic to become adequately relaxed than if no previous attempt had been made at subarachnoid block.

PRACTICAL POINTS

The first important point is to ascertain that the spinal anæsthetic is working satisfactorily.

No attempt should be made to test the efficiency of the anæsthetic upon any site which is not expected to be fully anæsthetised, or before sufficient time has elapsed after injection for anæsthesia to have developed. If a patient is once hurt the confidence of that patient is destroyed and is seldom completely regained. When testing anæsthesia, a sharp-pointed towel clip is the most satisfactory instrument to use. The patient should never be asked if he can feel anything or be allowed to see any test being performed, but the anæsthetist must watch carefully the patient's face. Imperfect anæsthesia will be shown immediately by a contraction of the orbicularis palpebrarum and, if very imperfect, the patient will screw up his entire face when stimulated. Anæsthesia does not develop at the same rate in every patient, and impatient surgeons must be firmly persuaded to give it a fair chance to develop. I have seen anæsthesia develop as long as 12 minutes after the injection of stovaine instead of the more usual 3–5 minutes.

The eyes of the patient should be kept covered during the operation, and with modern theatre lighting the screen alone is often insufficient to prevent the patient from developing a visual interest in the proceedings. Care must be taken to ensure that the eye-covering leaves the nose and mouth quite free.

As soon as the anæsthetic solution is considered to be "fixed," some degree of Trendelenburg position should be adopted in order to combat any tendency to cerebral anæmia resulting from fall in blood pressure. A small point is that if the operation necessitates a steep degree of Trendelenburg position, the wrists should be slung before the operation begins, as patients always complain that their arms are very uncomfortable when unsupported. Nausea or vomiting is best combated by the application of cold water to the forehead, and by instructing the patient to breathe deeply with the mouth wide open.

It should not be necessary to remind surgeons that the unanæsthetised chest of a conscious patient is not an ideal receptacle for heavy instruments, or that a patient should not be treated to a discourse on the state of his abdominal contents during their actual evisceration; but it is surprising how often these small points are neglected, although attention to them ensures that the operation is carried out with the minimum of discomfort to the patient.

CALCIFICATION AND OSSIFICATION IN THE SEMILUNAR CARTILAGES

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In a recent number of the *British Journal of Surgery* two contributors have drawn attention to cases of ossification in the semilunar cartilage of the knee-joint. Two cases of ossification in the *internal* semilunar cartilage are described by H. J. Burrows,[1] and the condition is described as "a rarity bearing on the metaplastic formation of bone." Watson Jones and R. E. Roberts,[2] describing two cases of ossification in the *external* semilunar cartilage, state that this condition of ossification has not been hitherto described as distinct from the calcification described by Mandl and other observers.

In such clinical cases it is advisable to search to what extent, if any, normal anatomical parallels can be found in the domestic animals for conditions which are regarded as pathological in man. All animals which have a poor degree of conformity between the articulating surfaces of the tibia and femur have semilunar cartilages. They reach their highest development in man, the primates, and standing birds, such as the crane or stork. They are partly or totally suppressed in such forms as the bats which hang by their thumbs instead of perching or standing on their legs. The discs are developed in proportion as the knee-joint exhibits rotatory and sliding movements as distinct from mere flexion and extension. Whereas the internal disc is usually C-shaped, the external disc may vary from an incomplete annulus as in man to an almost complete disc as in the baboon, chimpanzee, and gorilla. An external cartilage in the form of a complete disc has been described in man by Duncan[3] and others.

As regards the function of the discs MacConaill[4] has pointed out how, with poor approximation of articulating surfaces, the disc, by its wedge-like cross-section, facilitates the early stages of movement. MacConaill has rightly associated this with the condition described by engineers in relation to lubrication. During the first phases of movement at any bearing surfaces a wedge-like film of oil of uneven thickness is more desirable between bearings than a film of equal thickness.

If the mode of formation of interarticular cartilages in the embryo be considered, a complete view is obtained of the structural changes which such discs may undergo. All interarticular discs are persistent portions of the original mesenchyme of the skeleton of the limb. There is no evidence for the view put forward by Bland-Sutton[5] that any extra-articular structure, such as tendon, ever contributes to the interarticular disc. A diarthrodial joint, such as an interphalangeal joint, is formed by localised absorption of the core of embryonic mesenchyme so as to demarcate the articular ends of the bone. In any diarthrodial joint with a disc two areas of absorption occur in close proximity, the intervening mass constituting the disc. The degree of absorption determines whether the disc shall be complete, as in the

jaw, wrist, and sternoclavicular joints, or incomplete, as in the knee and acromioclavicular joint. Early stages of the demarcation of joints, with and without discs, are illustrated in "Bone Growth in Health and Disease" [6] (figs. 51-54). A later stage, at the knee-joint of the new-born rat, is shown (Fig. 1) to illustrate the histological identity of the two menisci with the cartilaginous ends of the bones. Afterwards, in the rat of about six weeks, the meniscus (Fig. 2) displays characteristic age changes in the cartilage.

FIG. 1

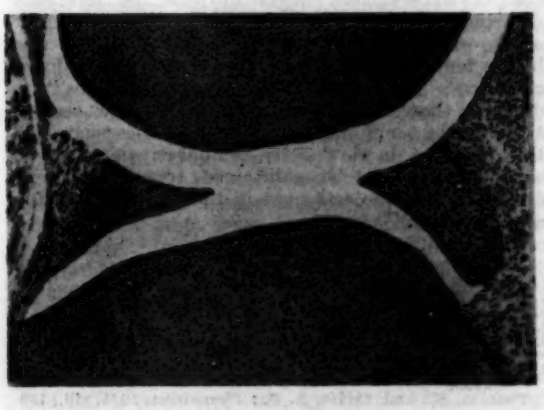

FIG. 3

FIG. 2

FIG. 4

FIGS. 1–4.—Longitudinal sections of the knee-joint of the rat: (1) at birth (× 300); (2) at 6 weeks (× 130); (3) at 10 weeks (puberty) (× 155); (4) at 16 weeks (adult) (× 100).

Near the joint capsule the tissue is essentially fibrous; near the periphery of the joint surfaces of the disc the tissue becomes more fibrocartilaginous both in terms of cells and fibres. At the centre of the disc the cartilage cells hypertrophy and become senescent. The matrix begins to calcify.

Some time later (Fig. 3) the mass of cartilage in the disc has reached such dimensions that it can no longer continue to live as cartilage proper. The problem of nutrition at the centre has become acute. The cartilage cells die, the matrix calcifies, and vessels from the capsule invade the zone. By a process which has much in common with aseptic inflammation, virtually dead calcified avascular senescent cartilage is replaced by vascular bone. At the periphery of the disc a narrow rim of cartilage persists which resembles in structure the hyaline cartilage near the articulating surfaces of the femur and tibia. This section (Fig. 3) shows very clearly a fringe of synovial membrane between the femur and tibia—a process of the ligamentum mucosum running from the infrapatellar pad of fat to the intercondyloid notch.

The relatively stable condition of the meniscus in the adult rat (Fig. 4) presents a disc in which a core of bone and marrow is surrounded by a narrow rim of calcified cartilage and a wider rim of cartilage which becomes more fibrous towards the free surface.

These progressive changes from undifferentiated mesenchyme to cartilage, fibrocartilage, calcified cartilage, and bone on the one hand, as in the rat and guinea-pig, or the change from cartilage to persisting fibrocartilage as in man, focus attention on the mode of nutrition of cartilage. Cartilage is essentially an avascular tissue in which the nutrition is carried on by imbibition of tissue juice. As in the case of a gumma or tubercle there is a limit to the size of such an avascular mass. Once this size is surpassed, the

cells at the centre undergo death with degeneration of the matrix, which may be either mucoid, fatty, or hyaline, and may be accompanied by calcification. Such calcified tissue may be replaced by bone. The intervertebral fibrocartilaginous discs of adult man, the mass of cartilage at the lower end of the femur in the new-born, the fibrocartilages of the ear and those of the larynx represent these limits of size. Whereas epiphysial cartilage, like diaphysial cartilage, undergoes calcification and ossification from within, fibrocartilages usually undergo calcification from without, on the free surfaces. This is shown by the laryngeal cartilages which in old age show small plaques of calcification on their surface, as is the case with the costochondral cartilages in old age or chronic respiratory disease.

The above facts should serve to distinguish between types of calcification and ossification in fibrocartilage. If the calcification and ossification is central in cartilage, it is usually part of the normal nutritional progression. If calcification occurs on the surface of a fibrocartilage it is essentially senile, allowing that such senility may be precocious as in the laryngeal and costal cartilages of patients with chronic bronchitis and emphysema.

If calcification and ossification occur in the centre of a mass of fibrocartilage it is usually consequent upon a localised zone of mucoid degeneration. Mucoid cysts of the semilunar cartilage, particularly of the external weight-transmitting disc, are not infrequent. Such areas of mucoid degeneration may undergo calcification and ossification as I have described [6] in conditions ranging from achondroplasia to stippled epiphyses.

This brief note has been written in order to warn the clinician and radiologist that calcification, or ossification, in the semilunar cartilages is not necessarily the cause of the derangement of the joint for which the patient seeks advice. If the calcified or ossified mass reaches such a size as to interfere with the surface contour of the disc then presumably symptoms must arise.

When Karl Pearson [7] undertook his intensive studies on sesamoid bones in man, he not only described calcified or ossified areas in the "fabella" of the external head of the gastrocnemius, but also in the tendon of the popliteus, and in the semilunar cartilages. He invented the term "lunules" to describe these small masses of calcified or ossified tissue in the semilunar cartilages, and it is suggested that the term, in view of the comparative anatomical significance, should be maintained, together with his designation of the sesamoid in the popliteus tendon as "cyamella."

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CLINICAL AND LABORATORY NOTES

THE EFFECTS OF COMMON SALT IN ADDISON'S DISEASE

RECORD OF A CASE

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THE work done in recent years on the inorganic bases of the blood-serum in adrenalectomised animals was the subject of editorial comment in THE LANCET (Jan. 20th, 1934, p. 137). In this connexion Loeb, among others, has shown a constant fall in the sodium content of the blood-serum in such animals. Further, he has found it possible not only to keep adrenalectomised animals alive by administering sodium chloride, but has also applied this treatment to patients suffering from Addison's disease with encouraging results. This is a matter of the greatest importance, since the present cost of potent cortical adrenal extract makes its general use impossible, and no other treatment has hitherto been found to give any relief in these distressing cases.

It seems desirable at this stage to record the result of treatment with sodium chloride even of isolated cases of Addison's disease. The following is a brief record of a case recently under my care in St. Bartholomew's Hospital, in which the findings differed strikingly from those reported in THE LANCET of May 5th (p. 950) by Dr. W. Gordon Sears :—

A. B., a man aged 40, was admitted on Feb. 14th last, complaining of extreme exhaustion, nausea, and vomiting. He had noticed a peculiar pigmentation of his skin since August, 1933. Further symptoms began in November, 1933, characterised by weakness and lassitude, anorexia, dyspnœa on slight exertion, and œdema of the ankles, which he noticed at the end of the day. The symptoms had been steadily progressive. He had lost about 4 st. in weight.

His past history was unimportant and there was no history of tuberculosis in the family.

His pigmentation had the characteristic distribution and was well marked on the buccal mucous membrane. The area of cardiac dullness was much reduced and X ray examination of the chest showed the heart to be unusually small. The exact measurements were not ascertained by the orthodiagraphic method. The sounds were very faint, but otherwise normal. His pulse was regular, of small volume, and obviously of poor tension; rate 110 per minute. The blood pressure varied between a minimum of 60/40 mm. Hg and a maximum of 78/48 mm. Hg whilst he was under observation. There was no tenderness in either loin and no enlargement of the liver or spleen. The urine was acid; the specific gravity was 1012; it contained a trace of albumin. There were no other abnormal constituents. The Wassermann reaction was negative in the blood. His blood count on admission was: R.B.C., 4,700,000; W.B.C., 11,600; Hb., 81 per cent.; C.I., 0·86. There was a lymphocytosis present, with a polymorphonuclear leucopenia, the differential count showing polymorphs 3074, large lymphocytes 4698, small lymphocytes 2900 (total lymphocytes 7598). No abnormal cells were present in the blood film. Fasting blood-sugar was 80 mg. per cent. The blood sodium, estimated by Dr. G. A. Harrison, was 298 mg. per cent., which is the equivalent of 130 millemolecules. A control on healthy blood donors gave 324 mg. per cent. and 328 mg. per cent.; a patient with renal calculi gave 336 mg. per cent., and a man with ? sprue 346 mg. per cent.

The man's condition during his first week in hospital remained substantially unchanged. On Feb. 23rd, at the suggestion of Dr. George Graham, he was put on 10 g. of sodium chloride daily. This was given in 2 g. doses in milk. The patient experienced no difficulty in taking it. The effect of this treatment was most dramatic. After 24 hours the patient, instead of lying listless and apathetic as he had for the previous week, was sitting up looking at an illustrated paper. His

nausea disappeared and his appetite improved at once. This improvement was maintained, and on March 7th the patient was allowed up. He stated that "he had not felt so well for months." The improvement was entirely subjective, as the blood pressure showed no rise, and the pigmentation remained entirely unaltered. On March 15th the daily dose of sodium chloride was reduced to 5 g. without the patient's knowledge. By March 26th he complained of feeling weak, lost his appetite, and vomited several times. The dose of sodium chloride was then doubled, again with an immediate improvement. The patient left hospital on April 5th. His blood pressure was unchanged, being 75/45 mm. Hg. His pulse-rate fell during his stay in hospital from 110 per minute on admission to 90 to 100 per minute when he was discharged.

Dr. Harrison estimated the blood sodium and found it to be 301 mg. per cent. on March 9th, when the man had been on sodium chloride 14 days. On March 19th, after four days of reduced sodium chloride (5 g.), the blood sodium was 315 mg. per cent. Unfortunately an estimation was not made of the blood sodium when the patient relapsed a few days later. It is remarkable that the blood sodium showed the highest reading when he was on half doses of sodium chloride.

During the period in which the patient was taking 10 g. of sodium chloride daily the hæmoglobin percentage in the blood fell steadily. It was 74 per cent. on Feb. 23rd, the day the treatment began, and had fallen to 65 per cent. by March 12th, although the patient was gaining strength and energy daily. During the period in which 5 g. only of sodium chloride were taken the hæmoglobin percentage rose again to 74 per cent. on March 20th and 84 per cent. on March 23rd. As was pointed out in the article in THE LANCET already referred to, it would appear that the adrenal controls the blood sodium, and that in Addison's disease there is a sodium leak from the body. Treatment with sodium chloride is obviously not in any way curative, but by supplying an excess, to some extent makes good the wastage.

The main differences between the case reported by Dr. Sears and my own are that in his case (1) the blood pressure was never really low and increased when a comparatively small amount (5 g.) of salt was being taken daily; and (2) the sodium in the blood-serum was very low (248 mg. per cent.) and rose with the small amount of salt to 452 mg. per cent.; whereas in my case the taking of sodium chloride caused only a very small rise in the serum sodium, although the man's symptoms improved enormously.

FRACTURE OF A SESAMOID BONE

BY THOMAS STREATFEILD, M.D. Durh.
AND
H. F. GRIFFITHS, M.D. Camb.

IN view of the rarity of uncomplicated fracture of the sesamoid bones, the following case appears to be of interest.

The patient, a healthy schoolgirl aged 15, was seen by us together in June, 1933. She gave the history that whilst jumping a "horse" during gymnasium her right hand "got left behind," and she twisted her thumb. She was seen about one hour after this occurrence, when there was swelling and severe pain in the region of her metacarpo-phalangeal joint. A diagnosis of fracture of the metacarpal bone into the joint was made. Upon X ray examination it was found, however, that the sesamoid bone at the head of the metacarpal was fractured (see Figure). The left hand showed a normal sesamoid. The thumb was

Fracture of sesamoid bone at metacarpo-phalangeal joint of thumb.

put up in full flexion and secured to the palm of the hand with strapping. It was kept in this position for five weeks, and a perfect functional result was obtained.

We are indebted to Dr. A. C. Rusack for his excellent radiograms.

Folkestone.

BILATERAL EMPYEMA

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HON. ASSISTANT SURGEON TO THE SALFORD ROYAL HOSPITAL

BILATERAL empyema is an uncommon condition and a rarity in the adult. Keyes [1] defines it as a condition in which pus is found in both pleural cavities at or about the same time and points out that it is most frequently met with in association with broncho-pneumonia—for example, during the influenzal epidemics of 1917–19. The case records since 1910 number 69 (Steinke [2]), and three-quarters of the patients are less than 12 years old (Keyes). The example reported here possesses additional interest in that the fatal outcome may be attributed to a pneumococcal infection of the urinary tract.

The patient, a man 26 years of age, became suddenly ill on April 1st, complaining of a severe pain in the chest; compelled to return home from business he coughed up sputum tinged with bright red blood and the diagnosis made by his medical attendant was that of a left-sided pleuro-pneumonia. After a crisis the temperature became irregular and an extending dullness of the left side of the chest was found whilst on the right a well-marked area of paravertebral dullness appeared. He was admitted to hospital on April 16th, dyspnœic and with a very irritating cough; dullness on the left side reached the fifth rib in the midaxillary line. Sixteen ounces of thick greenish-yellow pus were aspirated and from this the pneumococcus type I. was isolated. The X ray findings appear in Fig. 1. Aspiration was performed again on April 19th, and 25 ounces of pus evacuated. On the 21st a rib was resected on the left side and closed drainage established which remained airtight for six to seven days. The dullness of the right side was, however, extending and on April 25th 15 ounces of pus similar to that found on the left side were aspirated; aspiration was again carried out on the 28th and on May 1st, and, respectively, 14 and 25 ounces evacuated. On May 2nd a self-retaining catheter was introduced into the right side through a trocar and cannula and continuous aspiration and irrigation as described by McEachern [3] commenced.

[1] Keyes, E. L.: Ann. of Surg., 1931, xciii., 1050.
[2] Steinke, C. F.: Jour. Thorac. Surg., 1933, ii., 257.
[3] McEachern, J. D: Brit. Jour. Surg., 1933, xx., 653

Progress was satisfactory until May 8th, by which time drainage from the right side had decreased from an original 40 ounces to 12 ounces per diem. However, on this date the temperature rose to 103·6° and the patient became very ill. The temperature fluctuated between 101° and 104° for seven days, after which death occurred. During this period no pocket of pus was found either by X rays (Fig. 2) or by the exploring needle which was used only on the left side as the right appeared clear on X ray examination. Post mortem a needle again failed to find pus in the thorax after careful search. Three days before death the urine was observed to be turbid and there was frequency of micturition; the day before death symptoms of cystitis were prominent, frequency of micturition was marked and associated with hypogastric and penile pain. The urine on microscopical examination contained numerous pus cells and on culture the pneumococcus type I. was identified.

FIG. 1.—Before operation. Consolidation of both lower lobes and on the left side the shadow of a parietally situated empyema.

FIG. 2.—After operation. On the left side the drainage-tube is seen and on the right the catheter.

As regards the treatment of a bilateral empyema the first essential is the avoidance of a bilateral open pneumothorax during the early stages, and consequently open drainage is contra-indicated because further depletion of an already seriously diminished vital capacity in an exhausted patient is fatal. Therefore, guided by the condition of the individual patient, either aspiration alone of each side or closed drainage of one with aspiration of the other is the procedure of choice. Later in the disease when adhesions are firmly established bilateral drainage may be instituted; time should always be allowed for adhesions to become firm on the side first opened before operating on the second side.

In the patient recorded above McEachern's technique of continuous aspiration proved eminently satisfactory on the right side (Fig. 2), and I shall employ this method on both sides if another case presents itself.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SUBSECTION OF PROCTOLOGY

AT a meeting of this subsection held on May 16th, the chair was taken by Mr. W. E. MILES, the president, and a discussion on the

Treatment of Cancer of the Colon

was opened by Dr. F. W. RANKIN (Kentucky). He based his surgical attack, he said, on physiological and embryological considerations, remembering that the colon was a dual organ. In most cases the problem offered by cancer was a chronic one which undermined vitality by a subintoxication. Measures therefore were preoperative, operative, and post-operative. The fundamental preoperative procedure was decompression, which might be accomplished in three to six days by surgical or by medical measures (saline irrigation and purging). Cæcostomy was the operation of choice, especially by Hendon's method. Rehabilitation was accomplished at the same time by giving a diet high in calorie value and low in residue (sugars and fruit juices), and by blood transfusions, which were very valuable. Transfusion should not depend on the existence of anæmia, but could well be used as a routine. He was doubtful of the value of routine vaccine; he had used streptococci and colon bacilli from fatal cases and thought it a useful step in rehabilitation and control of subsequent peritonitis, but it was not to be recommended as an alternative to other measures. Some old principles might well be re-emphasised: multiple-stage procedures; measures which did not call for primary sutures in the left colon; and aseptic end-to-side anastomosis, to by-pass the fæcal current, between the terminal ileum and the middle of the transverse colon, for right-sided growths. If a one-stage resection was decided on, it should be supplemented by an enterostomy proximal to the suture line. Obstruction might be due to œdema and infection, apart from any faulty technique, and might be fatal.

Dr. Rankin showed slides illustrating the technique he preferred for Mikulicz's operation, which he regarded as the third choice. The mortality had been much lower in his hands than any other left-sided procedure, but it must be preceded by adequate decompression. He also showed prognosis figures from a review of nearly 400 cases. They showed forcibly that Broders's index of malignancy was the most important yardstick for prognosis. Other factors influenced the result, but the grading was of primary significance. Glandular involvement followed the grade grouping. In his series glandular involvement was rather more frequent on the right side, but this side nevertheless showed a higher percentage of five-year cures than the left. Cancer of the rectum showed much more frequent metastasis. The five-year cure figures for the four groups were 63 per cent., 51 per cent., 31 per cent., and 24 per cent. respectively.

Dr. Rankin finally showed a cinematograph film of an end-to-side ileo-colostomy.

Sir CHARLES GORDON-WATSON expressed agreement with Dr. Rankin's principles. In few surgical fields, he said, did judgment and experience play a larger part. In his experience many cases which at first sight seemed inoperable could be attacked after careful mobilisation. This variation made it difficult to assess statistics. Surgeons should aim at a high

operability-rate, while trying to reduce the inevitably high mortality-rate that must accompany it. He showed figures from two series of cases. They showed the advantage of increased experience. In his later series the mortality for resections was 8 per cent., omitting one pulmonary embolism, and the operability-rate 63 per cent. The five-year survival-rate was, however, only 33 per cent. In the first series the operability-rate had been 57 per cent. and the mortality 20 per cent. Anæsthesia had been improved, and the enormous value of pre- and post-operative blood transfusion must be emphasised. "Drainage first" spelt safety first. A primary resection was, of course, never justifiable in the presence of obstruction, and every patient with a growth in the distal colon was potentially obstructed. A side-to-side anastomosis could seldom be done in the pelvic colon, but was usually possible in other parts and was much safer than end-to-end. There was less risk of gaseous distension and subsequent contraction.

Exteriorisation operations should be ascribed to Paul, of Liverpool, rather than to Mikulicz. Their advantages were inestimable. He was accustomed in cæcostomies to bring the tube through a portion of great omentum and then to fix to the abdominal wall. A safety-valve should always be used, to avert gas distension. Large hypertrophic growths often produced a lot of large glands, but the end-results were better than in the small scirrhous type as the glands were generally inflammatory and not malignant. Far less risk should be run in colloid cases, for few survived more than a few years, however good the surgery. He had tried in 1911 to immunise the peritoneum with vaccines, but had given it up, as he had found no marked benefit, and two successive vaccinated cases had died of streptococcal peritonitis. Animal experiments were needed on this subject. He was sure that better results could be obtained in the future, especially when more was known about the diathermy knife. There were possibilities in radium and X rays for advanced cases. With the million-volt X ray apparatus or the heavy bomb it would become possible to irradiate exposed growths. In ten years' time the mortality-rate would be down to about 5 per cent.

Mr. J. P. LOCKHART-MUMMERY also agreed with Dr. Rankin. One of the greatest points of all, he said, was preliminary decompression. Multiple-stage operations were of the greatest value. After colon anastomosis an elbow of small gut was apt to get caught up against the suture and acute obstruction resulted. He therefore stitched omentum or some other form of fat round the anastomosis. The most difficult cases were those of carcinoma in the lower end of the pelvic colon. The method he had suggested—a tubular resection—worked in some cases but was highly dangerous owing to the unsatisfactory blood supply to the part. It was important to stitch the arms of colon together carefully in Paul's operation so that no mesentery could get between the ends and so get caught in the clamp.

Mr. G. GORDON-TAYLOR said he was more inclined to perform Paul's operation than he had been five years ago. In fat patients suturing was difficult, and mobilisation carried with it no mortality: he had only lost one case. In easy cases end-to-end or lateral anastomosis was satisfactory, but always a cæcostomy was worth doing. In most cases there was no evidence of hepatic or peritoneal involvement; in this event it was worth while dealing radically. He had removed parts of the abdominal wall, stomach, and other viscera, and his temerity had been rewarded by long survival.

Mr. LAWRENCE ABEL thought that blood transfusion had lowered mortality, and recalled Mr. Wilfred Trotter's advice that when a growth was anastomosed it should be extra-peritonealised. He described his technique for effecting this, and expressed satisfaction with the Rankin clamp. Another way of preventing post-operative distention was to give continuous intravenous saline for two, three, or five days.

Mr. W. B. GABRIEL disagreed on the necessity for a cæcostomy; he thought that the old-fashioned Paul's operation could be done with perfect safety provided the proximal bowel was drained.

Dr. RANKIN briefly replied.

REVIEWS AND NOTICES OF BOOKS

The Queen Charlotte's Textbook of Obstetrics

Third edition. By ALECK W. BOURNE, TREVOR B. DAVIES, L. CARNAC RIVETT, L. G. PHILLIPS, C. S. LANE-ROBERTS, and LESLIE H. WILLIAMS. London: J. and A. Churchill. 1933. Pp. 679. 18s.

As a manual of practical obstetrics this book is admirable. The teaching is clear and dogmatic, and the division into short paragraphs with frequent headings makes it one of the most readable of text-books, and eminently suitable for the student. In physiology and pathology the information given on some subjects is rather meagre; for instance, very little is said about the physiology of the placenta, or the pathology of placental infarction.

The section on puerperal pyrexia and sepsis is especially good, embodying as it does the experience which the staff have gained at the new isolation block of the hospital. A chapter on the technique and results of vaccination is an unusual and very useful feature in an obstetric text-book. In the chapter on antenatal care stress is laid on the necessity for frequent urine examinations during pregnancy, but not on the greater importance of blood-pressure estimation, which is now recognised to be often an earlier sign of toxæmia. The section on cardiac disease is not so good as the purely obstetric parts, and would benefit from revision by a cardiologist. Obstetric operations are well described and illustrated, but the lower segment Cæsarean section, which is becoming increasingly important, requires detailed description.

The practitioner will find this book a full and reliable guide to obstetric treatment. Both student and practitioner will appreciate the sound advice offered on obstetrical diagnosis and treatment.

Eye, Ear, Nose, and Throat

By E. V. L. BROWN, M.D., Professor of Ophthalmology; LOUIS BOTHMAN, M.D., Associate Professor of Ophthalmology; GEORGE E. SHAMBAUGH, M.D., Professor of Otology; and ELMER W. HAGENS, M.D., Instructor in Otology. With the collaboration of GEORGE E. SHAMBAUGH, JR., M.D., Clinical Assistant in Otolaryngology, University of Chicago. Chicago: The Year Book Publishers. 1933. Pp. 632. 11s. 6d.

As in previous years, this annual consists of abstracts from the current literature in these specialties of the previous 12 months; the papers abstracted have been selected with discretion from world-wide sources and have been skilfully summarised. In many cases editorial comments have been added which,

though inclined to be dogmatic, are always shrewd and to the point. Of outstanding interest is the description by Dr. A. B. Duel of 12 cases of facial palsy operated on by the method developed by Sir Charles Ballance and himself; this consists in placing an autoplastic nerve-graft in the exposed Fallopian canal, and his description of the technique is so clear that it may be undertaken by any aural surgeon. He contends that the operation should be performed whenever facial palsy follows immediately the mastoid operation, and that a suitable graft introduced without delay gives assurance of a quick recovery. The abstracts cover a very large field, and this year's volume, like the former numbers, is a valuable work of reference. A good index of authors and of subjects is supplied.

Applied Pharmacology

Fifth edition. By A. J. CLARK, *M.C.*, M.D., F.R.C.P., F.R.S., Professor of Materia Medica and Pharmacology in the University of Edinburgh. London: J. and A. Churchill. 1933. Pp. 632. 18*s*.

EVEN in the short time—two years—since the last edition of this book appeared, the advance in pharmacological and therapeutic knowledge has made necessary the rewriting of some and the alteration of many of its chapters. The increasing employment of the barbiturates as basal anæsthetics; the introduction of new synthetic compounds, such as plasmoquine and stebrin in the treatment of malaria; the work on hæmatology, which has revolutionised the treatment of various forms of anæmia—are all dealt with fully from the theoretical and practical points of view; while an admirable summary of recent knowledge regarding the sex and other hormones is included. The chief characteristic of the book is the detailed description of the physiology of the various systems of the body, and the means whereby normal and altered function can be affected by drugs and other remedial agents such as sera and vaccines and radiations. The work thus meets in every way the needs of the senior medical student, and of the practitioner who may desire to refresh his knowledge of the scientific basis of his therapeutical methods.

L'artériectomie dans les artérites oblitérantes

By RENÉ LERICHE (Lyon) and PIERRE STRICKER (Strasbourg). Paris: Masson et Cie. 1933. Pp. 198. Fr.40.

THIS monograph emanates from workers who have already established their claim to write with authority on arterial disease. It is carefully and modestly compiled, and suggests that in arteriectomy the authors have given to surgery an operation of definite value in selected cases.

Attention is drawn to the fact that the degree of ischæmia following arterial obstruction varies with the manner in which the obstruction is produced. Plugging of the artery with an embolus produces a devastating gangrene; simple ligature produces a temporary ischæmia generally compensated for more or less completely by the collateral circulation; whereas excision of the segment of an artery causes practically no circulatory embarrassment, by reason of a phenomenal dilatation in the muscular and cutaneous vessels. This contention is supported by numerous experiments on dogs even to the extent of excision, in stages, of all the limb arteries, the aortic bifurcation and iliac arteries, leaving an artery-less dog, able to run as far and as well as any other dog. The authors ascribe the benefit of arteriectomy to the removal of the sympathetic nerves in the adventitia, and they regard the totally obliterated artery as a sympathetic nerve transmitting no blood but only harmful impulses and therefore to be put out of action by excision of a generous segment. Numerous indications for the operation are given, including causalgia, traumatic rupture and thrombosis of arteries, Volkmann's paralysis, arterial embolism of too long duration for embolectomy or after failure of embolectomy. Unfortunately little hope is offered even by enthusiasts for this operation in the treatment in Buerger's disease, since it is said to be only rarely indicated in localised "mono-arterites" definitely located by arteriography.

The book makes fascinating reading, being full of ingenious theories and suggestions for methods of dealing with cases which are usually condemned as incurable.

A Short History of the Epidemic Infectious Diseases

By E. W. GOODALL, O.B.E., M.D., Author of a Text Book of Infectious Diseases. London: John Bale, Sons and Danielsson, Ltd. 1934. Pp. 113. 3*s*. 6*d*.

ALTHOUGH, as Dr. Goodall points out, epidemic infectious diseases play an important part in medical practice, their histories have not hitherto been presented together in a single volume. He is well equipped to repair the omission, and within the space of some hundred small pages he has contrived to present the essential history of 17 epidemic diseases. Unlike many epitomes this is no colourless presentation of facts, but an extraordinarily interesting book rich in literary and historical allusion. Dr. Goodall finds space too for brief statements of his own considered views upon such debatable conditions as the Athenian "plague" described by Thucydides and the English "sweating sickness." He rather inclines to the opinion that the former may have been typhus; the latter he believes, with Hamer, to have been influenza. It is to be hoped that this epitome will be so successful as to encourage Dr. Goodall to write at greater length upon historical epidemiology, on which he is one of the few authorities.

Alcohol: its Effect on Man

By HAVEN EMERSON, M.D., Professor of Public Health Practice, Columbia University. London: D. Appleton-Century Co. 1934. Pp. 114. 3*s*. 6*d*.

Dr. Emerson has set out to write a small text-book for teachers and students explaining shortly the action and effect of alcohol on man, as far as they have been ascertained. On the whole his book is impartial and accurate. Although the author opposes the use of alcohol and regards it as deleterious to civilised peoples, he appears to have formed his opinion on reasonable grounds and to have produced ample evidence to justify it. He gives alcohol credit for most, if not all, of the virtues that can reasonably be claimed for it, such as its uses as a medicine and for the aged. He reprints from an earlier book an interesting and helpful scale of toxic symptoms associated with varying amounts of alcohol in the blood; 0·3 mg. per c.cm., for instance, produces mild euphoria—"Everything is all right"; "Sure I'll loan you some money." With 0·5 mg. the drinker "can lick anybody in the country," but has observable difficulty in lighting a match. With 1 mg.

he staggers perceptibly and sings loudly; with 3 mg. he sleeps and vomits by turns, and with 4 mg. he is in deep anæsthesia. Mr. Emerson's conditions for the permissible use of alcoholic beverages are as follows: he recommends everybody responsible for the safety or lives of others to avoid it altogether and advises healthy adults of sound nervous system to limit themselves to beverages with a content of less than 10 per cent., taken slowly, at or after meals. The book can be recommended as a skilful compilation of facts concerning alcohol in small compass, couched in language which is perhaps rather too technical for the audience he addresses.

The Toxicology of Plants in South Africa

Together with a consideration of Poisonous Foodstuffs and Fungi. By DOUW G. STEYN, B.Sc., Dr. Med. Vet. Vienna, D.V.Sc., Head of the Department of Pharmacology and Toxicology, Onderstepoort Laboratories, Transvaal. London: Gordon and Gotch, Ltd.; South Africa: Central News Agency Ltd. 1934. Pp. 631. £2 7*s.* 6*d.*

ONE of the chief difficulties confronting the veterinary toxicologist is the fact that our knowledge of the active principles of plants and of their pharmacological action is limited to the relatively small number of species used in medicine or cultivated or exploited for other purposes. This work is thus welcome, for it collects under one cover much data concerning the South African flora which is known to be particularly rich in poisonous plants of potential danger to cattle and other browsing animals. The study of plant poisons is complicated by the fact that the toxicity of a plant may be influenced by the soil and climatic conditions under which it is growing, quite apart from the fact that many plants only secrete their poison in certain organs and at certain stages of their growth. Further, the susceptibility of different animals to the same poison varies considerably, and the tolerance of an individual animal may be influenced by its colour in cases of photosensitisation. Added to this is the fact that some plants such as Sorghum or Lathyrus, which are recognised fodder crops, may become toxic under certain climatic conditions or if fed in large quantity.

The general principles indicated above are dealt with systematically by the author, together with such subjects as the diagnosis and prognosis of plant poisons, the eradication of poisonous plants and the prevention of plant poisoning, and the reasons for negative or positive results in experiments with suspected plants. Then follow sections on poisonous foodstuffs, photosensitisation, food rashes, and fungi in relation to health in man and animal. The major portion of the book is, however, devoted to the section entitled Poisonous Plants, which provides a systematic description, with many illustrations, of the various toxic plants, giving their names in English and Afrikaans and very frequently also their native names, together with an account of the active principle, where known, and the symptoms, treatment, and post-mortem appearance of the victim. The inclusion of a large number of references enhances the value of the book, making it of interest not only to those concerned with South African veterinary problems but to workers in all parts of the world.

EUGENICS IN PRACTICE

A Series of Essays suggested by the Report of the Brock Committee

III.—INHERITANCE OF MENTAL DEFECT

THE rôle of heredity in the causation of mental defect has long been a fertile source of controversy. During the last few years two aspects of the problem have especially been discussed: (1) How is mental defect transmitted? (2) How much mental defect is hereditary? The first question is mainly biological and has no immediate sociological importance; the second has important sociological implications.

HOW IS MENTAL DEFECT TRANSMITTED?

Fifteen years ago, when Mendelian principles were being applied wholesale to the transmission of all human infirmities, it was commonly stated that mental defect in general was the product of a single recessive Mendelian factor or gene. This view has been substantiated in respect of two rare types of amentia, amaurotic family idiocy[1] and a type of defectiveness described by Sjögren in a circumscribed area in Northern Sweden.[2] Here it was shown that 52 cases, occurring in 34 families, were all related to each other. The demonstration of consanguineous marriages in the ancestry is important in establishing that a rare abnormality is the product of a recessive gene.

But so far as the bulk of mental defect is concerned, it is now certain that this hypothesis does not hold. It does not, however, follow that, because the inheritance of an abnormality does not accord with simple Mendelian ratios of dominance, recessivity, or sex-linkage, the mode of its transmission does not conform with Mendelian principles. The fact has frequently been noted that mental defect occurs, apparently haphazard, in pedigrees wherein appear an excess of other abnormalities such as insanity, epilepsy, psychoneurosis, alcoholism, and sometimes suicide. To account for this so-called polymorphism, the doctrine of blastophthoria* or germ vitiation has been advanced. According to this, the gametes are exposed to damage from toxins or other noxious agencies which, while not impairing their viability, are capable of producing "polymorphic" abnormalities in later generations. This view derived much support from the papers of Stockard[3] according to which the descendants of alcoholised guinea-pigs exhibited weakness and deformities up till the fourth generation as compared with control litters. His experiments were, however, repeated later by Durham and Woods[4] with entirely negative results. But Stockard's findings provided propagandist ammunition

[1] von Torsten Sjögren: Hereditas, 1930–31, xiv., 3.
[2] Idem: Acta psychiat. et neurolog., Suppl. II., 1932.

* The term blastophthoria was first used by Forel, and is in many respects unsatisfactory. The word βλαστός means a shoot or sucker; also a child. It therefore suggests a somatic structure rather than a germ cell, and this implication is borne out by its use in such words as blastoderm and erythroblast. The word φθορία means corruption or mischief. The word blastophthoria therefore implies an agency which damages the fœtus rather than the germ cell. The word has suffered from being written by many psychiatrists as "blastophoria." To leave out the "th" is a solecism equivalent to omitting it in such words as diphtheria or ophthalmology, and indeed entirely changes the meaning of the word. The word phoria, as in euphoria, is derived from φέρω, I bear, and the word blastophoria, as commonly used, should therefore mean the process of carrying something embryonic, as does the pregnant uterus. Psychiatry would suffer no harm if the word were dropped altogether.

[3] Stockard, C. R.: Am. Nat., 1916, xlvii., 641.
[4] Durham, F. M., and Woods, H. M.: Med. Res. Coun., Special Report No. 168, 1932.

of first-class quality for reformers, and the ground was thus laid for the reception of the doctrine of blastophthoria. Of blastophthoric agencies, the most commonly quoted are alcohol and the toxins of syphilis and tuberculosis. It has also been suggested that certain chemical spermicides used in contraception have such effects.

The controversy over the causation of amentia between the believers in blastophthoria and in Mendelian principles has been one of the most inept in the annals of medicine. There is no incompatibility between the two views. Two agencies are known to be capable of damaging the germ cells in such a way as to produce observable effects on later generations—namely, X rays and (perhaps) radium. The former have been shown by Bagg[1] to produce in mice such deformities as club-foot, syndactylism, polydactylism, absence of one kidney, and ocular defects which are inherited as recessive Mendelian characters. That normality or defect of a thing as complicated as the mind should always be the outcome of a single gene is, on the face of it, very unlikely. The probability is that most cases of familial primary amentia are the product of several Mendelian factors which act cumulatively, some of them incompletely recessive or even dominant. In these circumstances, no fixed ratios such as occur in simple Mendelian inheritance would be observed, and the abnormalities might well take different forms depending on which pathological genes happen to combine in a given zygote.

Since we are as yet very ignorant about the cause of mutations, it is clearly impossible to rule out so-called blastophthoric agencies. But to argue that this mode of causation is incompatible with the inheritance of a given abnormality according to Mendelian principles is clearly absurd; indeed, this contention seems to be the outcome of a failure to understand that a somatic character can be the product of the joint action of more than one Mendelian factor.

HOW MUCH MENTAL DEFECT IS HEREDITARY?

This question clearly has important social implications, since everyone wants to prevent mental deficiency, and the answer to it will guide us as to how to achieve this end. If the bulk of amentia is the outcome of bad heredity we shall seek to abolish it by genetic or eugenic means; if of bad environment we must act in other ways. Actually, the estimates of how much defect is attributable to these two causes respectively vary between surprisingly wide limits. As remarked in the recent report of the mental deficiency committee set up by the council of the British Medical Association:

> "Some medical authorities on mental deficiency as legally defined consider that 80 per cent. of the certifiable cases are due to hereditary factors. Others consider that it cannot be *proved* that more than 10 per cent. are so inherited."

The cause of this astonishing divergence is not far to seek. "The term heredity," says the B.M.A. Committee, "as here used, implies that in the ancestry of any given case of mental deficiency there has existed a morbid condition of bodily and/or mental development which may have taken the form either of mental deficiency or some neuropathic condition, or of some other defect due to damage inflicted on one or other of the germ cells before fertilisation." It does not take much scrutiny of this sentence to perceive that the phrase "in the ancestry" is subject to an infinity of different interpretations. Does it mean the direct ancestry as represented by the two parents, the four grandparents, the eight great grandparents, or does it include such relatives as uncles, aunts, and sibs of the grandparents or great grandparents? Or are brothers, sisters, and cousins included? Clearly they ought to be so included. It is of the first importance, for instance, in examining a pedigree of hæmophilia to ascertain whether sufferers from this malady are collaterally related to each other through the male or female line. Which of us, whether normal or defective, has not an ancestor without "some neuropathic condition or other defect"? We are not much helped by the passage about the damage to one or other of the germ cells before fertilisation for the excellent reason that (apart from exposure to certain rays which play no part in everyday life) no agencies are clearly known which damage the germ cells in such a way as to produce genetic effects.

There is clearly enormous scope for variations in the standards and methods employed by different investigators. To take the standards first. One inquirer might not be prepared to attribute causal significance to heredity unless he found in one or more near relatives a grave abnormality such as puerperal insanity in the mother, or marked dullness in the father. Another investigator might be satisfied with alcoholism in one of the grandparental sibs. The requirements of the passage above quoted would be satisfied if a case of cleft palate were discovered in an ancestor living in the fifteenth century. With regard to methods, it will be clear that one investigator might not go further than, as a routine, asking a relative: "Are there any cases of nervous breakdown, suicide, insanity, fits, or heavy drinking on either side of the family?" The person questioned answers that there are not, and the investigator makes a note: "Family history negative." The relative may be lying, or may, in the stress of the moment, have overlooked someone who ought to have been mentioned, or, as very frequently happens, may know nothing of his distant relatives, who may be in Russia, Poland, or even some distant part of England. Another investigator may think it necessary to visit the home, personally interview all the relatives of the patient he can find, and may be prepared to take much trouble in tracing relatives with whom those responsible for the patient have lost touch.

A new and obviously useful view of the influences of hereditary and environmental factors is set forth by Dr. L. S. Penrose in a recent book.[2] Both factors, he says, usually coöperate in producing the effects which lead to certification. The importance of this standpoint is appreciated by the Brock Committee which makes frequent references to Dr. Penrose's investigations. Intellectual retardation amounting to feeble-mindedness need not of itself lead to certification provided that the subject does not make a nuisance of himself. The necessity of certification arises because, in one way or another, a subnormal individual behaves in an antisocial manner. His intellectual retardation may be the product of heredity; the antisocial behaviour of bad example, bad upbringing, or bad companionship. In no less than 62 per cent. of his cases, Dr. Penrose considered that both these factors were operative in bringing about certification.

[1] Bagg, H. J.: Amer. Jour. Anat., 1929, xliii., 167.

[2] Penrose, L. S.: Mental Defect. London: Sidgwick and Jackson Ltd. 1933. Reviewed in THE LANCET, 1933, ii., 1153.

THE LANCET

LONDON: SATURDAY, MAY 26, 1934

A NATIONAL HOUSING PLAN

A "Housing Commission" to take charge of the administrative and executive functions of the Ministry of Health in relation to housing is recommended in the interim report[1] of an unofficial committee sitting under the chairmanship of Lord AMULREE. The Committee lays down the proposition as fundamental that "the provision of housing accommodation, not below a minimum standard, for every family in the United Kingdom, should be accepted as a public responsibility and a national service, as the provision of a pure water-supply or a minimum standard of education has been accepted," with the obvious corollary that the rents must be within the means of the lowest paid wage-earners. This is a proposition which the public opinion of the country may be said to have definitely approved, and there will be general acceptance of the Committee's view that the object of policy must be to provide within the next ten years, in addition to houses needed to replace slum dwellings, at least a million new houses to be let at rentals (inclusive of rates) of 10*s*. a week and under. Only in this way is the overcrowding, which is the root-cause of slums, likely to be overcome. Nothing less than long-term planning on a national scale, however, would suffice to overtake such a programme, and the prospects of success would be brighter if it were found possible to take housing right outside party politics. With a view to securing continuity of policy, able to survive changes of Government, the proposed Housing Commission would be set up with a full-time, independent, non-party chairman, and would be endowed with national scope and status after the model of the Central Electricity Board. One of its duties would be to stimulate the formation of public utility societies in suitable cases and to carry out the recommendation of the Moyne Committee with regard to a central public utility council and the wide adoption of educative management.

It is clear that the authors of this interim report recognise the urgent need for the further housing legislation at present under consideration by the Government, including large scale acquisition of semi-slum overcrowded properties which are to be transferred to public or semi-public ownership, and which under skilled management will provide a useful half-way house between slum conditions as they exist and the new cheap dwellings. One of the most interesting paragraphs, which concerns finance, will be read with relief by many people who, profoundly impressed and depressed as they are by the national evil of the slums and of overcrowding, have felt that the way to reform is blocked by the magnitude of the sums involved in any comprehensive plan of reform. It is suggested that the Housing Commission should have power to issue a National Housing Stock, carrying a full Government guarantee; as long as such stock can be issued on a 3½ per cent. basis, which is at present the case, it is pointed out that "the rents of minimum standard houses can be reduced to such a figure as to bring the economic rent within the ability to pay of the wage-earner in all but exceptional classes of cases." For a million new houses a capital sum of £400,000,000 would be ample, and of this not more than £80,000,000 would be required in any one year, and the issue of National Housing Stock on this scale should not adversely affect the gilt edged market.

It can hardly be doubted that a building programme on the scale indicated would be one of the most constructive ways of dealing with unemployment, for over 80 per cent. of building costs, apart from site values, go directly or indirectly into wages. It does not seem likely that any liability would fall on the Exchequer, but even if a proportion of £16,000,000 a year did become a burden on the taxpayer it would be a small price to pay for the national benefits to be secured from the realisation of a housing programme on this scale. The Housing Commission would not itself be the owner or manager of any houses, ownership of all houses built under the national programme being vested either in the local authorities or in public utility societies. One of the most difficult aspects of the whole matter lies in the nature of the relationship between the Commission on the one hand and the local authorities on the other; the report states merely that the Commission will work in full coöperation with the local authorities. It is to be hoped that in their final report the Committee will work out in some detail this part of their plan, because therein lies the real crux of the problem, and no plan will command general acceptance which does not afford assurance of smooth working.

[1] Obtainable from the Honorary Secretary, National Housing Committee, 5 Duke-street, Adelphi, London, W.C.

TREATMENT OF CONGENITAL SYPHILIS

THE treatment of syphilis varies widely from country to country and from clinic to clinic, and any attempt to arrive at standards which the practitioner may have in mind in the care of his particular case is to be welcomed. Such an attempt was made, for congenital syphilis, by Dr. DAVID NABARRO at a recent meeting of the Medical Society for the Study of Venereal Diseases, of which he is president. A series of questions, intended to crystallise the discussion, had been circulated to the members, and these questions in

themselves indicated the difficulty of choosing the ideal scheme. Several important points were nevertheless brought out in the discussion.[1] In the first place none of the speakers was satisfied to rely solely on the time-honoured mercury in the treatment of congenital syphilis. It was agreed that although the symptoms may clear up quite readily under its influence, the improvement is often followed by relapse, both clinical and serological. Of single drugs the best on the whole are arsenobenzol derivatives which may be given either intravenously or intramuscularly. Very good results can be got with these, but their effect is quicker and more lasting if they are used in conjunction with (or alternating with) bismuth, preferably in the form of bismuth oxychloride. This combination has proved very efficacious and toxic effects are rare in infants and children. Dr. NABARRO also mentioned cases treated with arsenic by mouth in the form of Orasan or Stovarsol, and was able to report good results, although not yet prepared to describe them as cures. Should this method prove adequate there is no doubt that in many centres it will soon replace treatment by injection, as it seems to have done already in some continental clinics. The main disadvantage is that this remedy, like mercury inunctions, is administered by the parent and may not reach its destination in exactly the quantities prescribed; whereas injection of drugs at a clinic ensures that they will do so.

The question how much treatment is necessary for cure is still in debate. Dr. NABARRO is prepared to give the minimum necessary to render the patient free from symptoms and serologically negative, provided he is certain of being able to keep the case under observation several times a year, at least until puberty. If this is not possible it is advisable, he thinks, to continue treatment vigorously for at least two years, irrespective of the clinical condition. It was also pointed out in the discussion that it is wise to be guided by a precipitation reaction of the blood, such as the Kahn, rather than by the Wassermann reaction, which usually becomes negative first. A routine examination of the cerebro-spinal fluid is highly desirable in all cases, whether they exhibit nervous symptoms or not. Those with a positive C.S.F. reaction should be treated with Tryparsamide intravenously and bismuth intramuscularly, and if this is done only the more severe ones will require malariotherapy. The late Dr. DAVID LEES reported excellent results with this routine, and also favourable results in about 30 per cent. of juvenile general paralysis cases treated with malaria.

Finally it cannot be pointed out too often that the ideal approach to the problems of congenital syphilis is by way of prevention—by detecting the syphilitic mothers and treating them adequately during each pregnancy. By this means it can be made almost certain that the child will be free from the disease at birth; or if not entirely free that it will be so little affected as to be curable in a very short time.

[1] Brit. Jour. Vener. Dis., 1934, x., 1.

PITUITARY EXTRACT AND BLOOD PRESSURE

OLIVER and SCHÄFER in 1895 reported that the blood pressure of anæsthetised animals rises on injection of extracts of the pituitary gland, and later it was shown that this effect is due to an active principle which is obtainable from the posterior portion or pars nervosa though formed, it is said, in the pars intermedia. The effect of this principle on the blood pressure has now been investigated, both in man and animals, by many workers. In man it seems to have no constant influence, some observers reporting a rise of pressure, and others a fall, after subcutaneous or intravenous injections. The conflict of evidence, however, does not seem to be reflected in any general doubt about its clinical efficacy. As W. M. MOFFATT[1] points out, the statement appears in the latest edition of "New and Non-official Remedies" that the "intravenous or subcutaneous injections of preparations of the posterior lobe are followed by an increase of blood pressure which is maintained over a considerable period"; and manufacturers of these preparations often recommend their use in cases of hypotension and shock with the object of raising the pressure. Similarly they suggest that the drug should be withheld where hypertension is already present.

In his own experience, MOFFATT finds no ground for supposing that pituitary extract ever causes blood pressure to remain at a high level for a "considerable" period. In the investigation described in his paper he gave intramuscular injections of 1 c.cm. of obstetrical pituitrin to 62 persons ranging in age from 8 to 56 years, with initial systolic pressures varying between 82 and 218 mm. Hg and diastolic pressures of 58 to 110. They were observed at frequent intervals for an hour after the injection, and no constant alterations in the blood pressure were found. In many patients there was little or no change; in a few there were conspicuous changes in pressure, but more often a fall than a rise. Over the hour of observation the general trend of the pressure, after an initial temporary rise, was downward. This downward trend was characterised by a fall of the systolic rather than of the diastolic pressure, and consequently a slight constant decrease of the pulse pressure was observed. In general it was found that the higher the initial systolic pressure the greater was the fall following the injection of pituitrin, which suggests that the drug is not necessarily contra-indicated in cases of hypertension. In this connexion MOFFATT raises the question whether in his cases arteriosclerotic changes were more extensive in the peripheral than in the coronary vessels. If so, the constriction produced by pituitrin would be greater in the coronary than in the peripheral vessels, and he propounds this as a possible explanation of the greater fall of pressure in hypertensive cases.

Using the preparation known as infundin, B. SACKS,[2] in 1924, found that a small but dis-

[1] Amer. Jour. Med. Sci., 1933, clxxxvi., 854.
[2] Heart, 1924, xi., 353.

tinct elevation of the arterial pressure was the rule, the maximum occurring about one minute after intravenous and three minutes after subcutaneous injection. In none of his cases was there a fall of pressure that could be attributed to a direct action of the drug, and during the hour of observation after injection no fall of pressure took place. Contrary to what was noted in MOFFATT'S cases there was more often a change in the diastolic pressure than in the systolic; but in both series the pulse pressure—the difference between systolic and diastolic—was reduced. The contradictions of the two sets of observations perhaps may be explained by the fact that MOFFATT used pituitrin and SACKS infundin, both of which are posterior lobe extracts but prepared by different manufacturers. Variation in the effects of injection, both in man and animals, is only to be expected until the hormone has been isolated in its pure form, and in the preparations now available there are probably small quantities of other active principles which have some effect on the blood pressure. It is also of some practical importance to note the possibility that anæsthetics modify the action of the drug. C. M. GRUBER[3] in 1929 found that vasopressin and pitressin caused a rise of pressure in dogs anæsthetised with chloral but a fall in those which had no anæsthetic. A series of subsequent papers[4] from McGill University tends to confirm this observation—in so far at least as they show that "a fall of blood pressure is the predominating effect of the intravenous injection of pituitary extract in the normal unanæsthetised dog."

The experiments so far described deal with the action of posterior pituitary hormone when injected intravenously or subcutaneously, but there is already reason to believe that physiologically posterior pituitary hormone is secreted into the cerebro-spinal fluid. This is important, for HARVEY CUSHING has shown (1931) that the hormone, when injected into the ventricle, produces effects which differ from the effects of subcutaneous injection. Recently H. HELLER[5] has produced convincing evidence that when pituitary hormone is injected into the cisterna magna of unanæsthetised dogs there is a marked increase in blood pressure which he has shown to be of central and not of peripheral origin. It may well be that physiologically pituitrin influences blood pressure mainly by its action upon the vasomotor centres, and that the changes in blood pressure after subcutaneous injection are of pharmacological rather than of physiological interest.

[3] Jour. Pharm. and Exp. Therap., 1929, xxxvi., 155.

[4] Ibid., 1930, xxxviii., 461 and 473; 1931, xlii., 455; 1933, xlvii., 355.

[5] Klin. Woch., Feb. 17th, 1934.

ANNOTATIONS

SPA TREATMENT

THE accounts in the medical and especially the daily press of the recent conference at Harrogate have been of a character that should be very encouraging to the British Health Resorts Association, a body which has not received the attention from the medical profession which it merits. Speaking at the dinner given by the Harrogate Medical Society to delegates from the Association who were attending the conference, Lord Meston, the president, made an important point when he said that the receipt by British spas of State subsidies was not being sought. Many, if not most, continental spas receive such assistance, and having regard to the large sums of money that are expended at these centres by foreign visitors no doubt the policy can be justified; but in this country medicine is more shy of receiving money from any source where other than therapeutic grounds might influence the allocations. Municipal and medical endeavour at each locality, it is held, is often likely to result in scientific treatment; but more than one speaker at the Harrogate conference, as at previous conferences, indicated ways in which local interests might be at variance with regimented treatment. The British patient on his home soil is not taken over, as it were, by his medical advisers and subjected to the course of beneficent dictation, especially with regard to diet, to which he has to submit in many places abroad; and while this suits the national temperament, and no harm should result where the patient is obedient and self-controlled, there is always a risk lest opportunities provided by residential hotels or lodging-houses should tempt the more pliable invalid to treat the therapeutic spa too much as a focus of diversion. The blame here is often laid upon the wrong shoulders, for it is the medical men who have dwelt with such insistence upon the benefits to the sick not only of change of air and environment but also of amusement. The remedy lies in the hands of the doctors, and several speakers at the Harrogate conference pointed to the direction which it should take. There should be close coöperation between the municipal officers and hotel managers and the doctors, all concerned combining to regulate the patient's life exactly in accordance with the attempts to cure or to relieve his condition. This will become easier as British spas develop the intent to specialise in their objects, and to become centres for the treatment of the particular cases found to be most amenable to the natural resources of the health centre. Colonel W. Byam, chairman of the medical advisory committee of the B.H.R.A., described as one of the first duties of the Association the diffusion of information obtained from local conferences, and that procedure will become more valuable as the information grows more precise. What many members of the medical profession want to know are the reasons for believing that patients of a certain class will be well advised to resort to spas possessing certain resources.

THE FILTERING CAPACITY OF LYMPHATIC GLANDS

FILTRATION by lymphatic glands has long been a commonplace of medicine. Investigations on the lymphatic system made by Prof. Cecil K. Drinker and his colleagues during the last three years at Harvard University have made clearer its mode of action and its marked efficiency. As to the former, Drinker, with George B. Wislocki and Madeleine E. Field,[1] showed that when, by the technique which they have perfected, a lymphatic gland of a heparinised dog anæsthetised with nembutal is

[1] Anat. Record, 1933, lvi., 261.

perfused through its afferent lymph vessel with dilute Indian ink, the retention in it of these microscopic particles is almost complete. Section of the gland shows that the walls of the marginal or cortical and of the intermediary sinuses, and the reticular fibres which cross and recross them, are studded with these minute particles. Some of Dr. Drinker's sections displayed at a meeting of the Royal Society of Tropical Medicine and Hygiene last November showed in striking manner the effects of this spider's web quality. The efficiency of this filtering capacity has since been measured in a number of animals by Drinker, Field, and Hugh K. Ward,[8] using either red corpuscles or haemolytic streptococci. Their technique is such that they can isolate the afferent and the efferent lymphatic of the popliteal gland of a dog without interfering with its blood-supply, and run through it a measured quantity of an even and standardised suspension of the test fluid at a pressure which their earlier work has shown to be within normal limits, that is to say, those which obtain under passive movements of the limb. From their numerous experiments they have reached the opinion that lymph entering a gland passes as readily through the intermediary sinuses as it does round the marginal sinus; in other words, much of the lymph which reaches the efferent vessel has passed through the gland, and has not merely skirted it by way of the marginal sinus as M. Nordmann has suggested it does. Measured numerically, by counts of red corpuscles or of the streptococcal colonies grown by plating the fluids of the afferent and efferent lymphatic vessels, it appears that when the pressure of entering lymph was less than 30 mm. of mercury, only one corpuscle in 200 escaped through the gland, while no colonies appeared in the efferent fluid even when the entering fluid contained 30 million streptococci per c.mm. Their results show how excellent a filtration arrangement, even before biological reaction begins, is this relatively huge sinus space with its wide and irregular paths and its multitude of baffles. But the perfection of that mechanism depends largely upon persistent quiet and rest, for even very gentle massage of a gland which is perfused with red corpuscles results in the appearance of large numbers of these in the effluent. Here then is experimental proof of the essential need to insist on immobility from the beginning of septic inflammatory conditions. The writers add that their facilities have not permitted them to test the filtration of microfilariæ, but that their results with red corpuscles suggest that the much larger microfilariæ would have great difficulty in passage; accordingly they hope that their paper will induce workers within the tropics to test this point. That should certainly be undertaken without delay. Nevertheless it will be disappointing and a marked loss to medicine if the operative skill and experimental experience available in the Harvard laboratory cannot obtain the means to try out a point so important in the pathology of Bancroftian filariasis.

[8] Jour. of Exper. Med., 1934, lix., 393.

EFFECT OF METALS ON BONY REPAIR

Surgeons with some experience of fractures are aware that plating of the fragments may result in defective repair. Occasionally there is complete failure of union with formation of a false joint; more frequently there is simple delay; often there are signs of a rarefactive process, the screws become loose, the fragments become displaced, and the advantage of accurate apposition is lost. These effects happen when there has been no discernible fault in operative technique and no infection. A number of experiments on animals to study the effect of metals on the growths of new bone have been made, but nearly all these have been unsatisfactory because they have been performed under conditions with too many uncontrolled factors. In a recent publication G. Menegaux, P. Moyse, and D. Odiette report[1] their experiments to elucidate this problem. Maintaining that it is a purely cellular problem, they have tested the influence of different metals on the growth of fibroblasts and osteoblasts in vitro. All the experiments were made upon chicken tissue grown in plasma by the ordinary routine methods of the laboratory. Taking precautions to make the conditions of the experiment as uniform as possible, they found they could classify metals into three groups: those that seriously interfered with growths of cells, those that had a slightly inhibitory effect, and those that had apparently no influence upon the growth and life of the cells. It is of great importance to note that the metals grouped as very toxic are just those which are commonly employed in bone surgery—namely, soft steel, iron, and aluminium bronze. These metals produce great inhibition of growth of cells in artificial culture. Of medium toxicity may be mentioned nickel and certain aluminium alloys. Non-toxic metals were found to be gold, aluminium, lead, and some of the new stainless steels. There may be, and are, objections to transferring the results of experiments under such artificial conditions to those in the living body; yet the test was a severe one, for the life of cells in culture where the products of metabolism remain to exert their harmful effects is more precarious than those whose circulation is intact, and more likely to be injured by metals than the cells under the more favourable conditions of life in the body. These researches certainly seem to indicate the advantages of stainless steel, which many surgeons have come to realise from experience, especially in the treatment of fractures in the neck of the femur. Nails were shown by Delbet and others to delay or prevent union. The success of the stainless steel Smith-Petersen type of peg may be due largely to the material of which it is made.

[1] Presse Méd., April 21st, p. 658.

THE TRAINING OF PUBLIC HEALTH NURSES

It is estimated that there are at present some 20,000 public health nurses employed in the United States by approximately 5000 organisations. Roughly one-third of these nurses work for "voluntary" organisations—i.e., they are not under governmental administration. The other two-thirds are under the direction either of official educational authority or under departments of public health. In 1912, when there were some 3000 public health nurses already in the field, a professional organisation, the National Organisation of Public Health Nursing, came into existence. Since then this central group has been engaged in coördinating experience, formulating standards and criteria of performance, and in general working for improvement both in the opportunities to be sought and the ability to make use of them. In 1931, aided by a grant from the Commonwealth Fund, the organisation undertook a survey of a cross-section of the public health nursing profession. The results of this survey have just been published.[2] The survey

[2] Survey of Public Health Nursing Administration and Practice by the National Organisation for Public Health Nursing. Katharine Tucker, general director, and Hortense Hilbert, assistant director for the survey. New York: The Commonwealth Fund. London: Humphrey Milford, Oxford University Press. 1934. Pp. 262. 8s. 6d.

was made in 28 communities, rural and urban, in all sections of the country. The distribution of the public health nursing service was found to be very uneven, having little or no relationship either to need or to potential capacity to pay for nurses. The most common ratio of service was one nurse per 3000 to 4000 population, but the surveyors do not consider this an ideal index since it is too inflexible and is based upon actual rather than planned conditions. An interesting recommendation is that official services should be supported by "advisory committees" composed of laymen and laywomen who are interested in the work of the nurse. They are to interpret to her the anxieties and the needs of which the community is conscious; while she explains to them the needs which are apparent to her and the means by which they may be satisfied. In this way false economy in the curtailment of essential health service can be to some extent prevented. In the opinion of Dr. Livingston Farrand, who writes a foreword to the report, its most important feature is the evidence supplied of the great immediate need for improvement in the preparation of the public health nursing personnel. The defects of the present system of training are said to be specially noticeable in the inadequacy of public health nursing service among school-children. It is shown that most nurses have little or no contact during their professional training with healthy children after the period of infancy; and they come to public health nursing with relatively little knowledge or understanding of the health problems of the children of this age-group. The nurse should therefore have post-graduate training in public health and properly supervised experience in those duties of a public health nurse which are not a part of an ordinary hospital training. It is not only in the United States that an impression is growing that the preparation of the public health nurse for her important duties is inadequate, and the qualifications suggested by the National Organisation of Public Health Nurses for future candidates for this service have more than local interest.

THE INCIDENCE OF DIABETES

IN a further study [1] of diabetes mellitus by Elliott P. Joslin, Louis Dublin, and Herbert Marks, the magnitude of the problems involved is indicated by means of calculations of the probability of dying from this disease and of the number of cases existing at the present time. On the basis of the death-rates experienced in the United States in 1930 it is found that 15 white males per 1000 born and 27 females per 1000 will eventually die from diabetes. In both sexes the probabilities based upon these 1930 death-rates are at every age appreciably higher than those given by the death-rates of 1920—in fact for females the increase is of the order of 50 per cent. at each age. For both sexes the risk increases slowly to a maximum at 50–55 years, shortly after which other causes exact a greater toll and a rapid decline in the diabetes risk is apparent till the end of life. With such death-rates, over two and a half million persons, or 2·08 per cent. of the population living in the United States in 1930, may be expected to succumb to diabetes—i.e., if the current mortality experience continues to prevail. The present incidence in the United States is estimated to lie between 300 and 400 thousand cases at any one time. A closer scrutiny of the mortality experience suggests that the disease is more prevalent and is increasing faster in urban areas than in rural areas. Racial differences can be only roughly assessed, but using material from New York State and Pennsylvania it was found that the Teutonic peoples suffered more frequently than the Latins, while statistics confirm the clinical observations of an excessive frequency amongst Jews. The Irish, who in Ireland have a low death-rate, show a relatively high rate in the United States, a paradox which the authors attribute to two factors—the higher level of prosperity among the Irish in the States and the disproportionate number engaged in the liquor trade. The occupational mortality statistics of England and Wales have revealed the abnormally high diabetes mortality of persons engaged in this trade (inn-, hotel-keepers, publicans), their rate in 1921–23 being nearly three times that of all occupied and retired males and the highest recorded for any large occupational group. Taken as a whole, the Registrar-General has shown, diabetes mortality varies directly with social status, decreasing with each successive broad grade of social standing. Rates below average are found both in this country and in the United States amongst farm workers and miners, and the incidence appears to be generally low in persons engaged in occupations requiring hard manual labour.

It is well known that the war period 1914–18 was marked by considerable declines in diabetes mortality. This improvement was not confined to the belligerent countries but was, at least to some extent, apparent amongst neutral populations. With the diversion of physicians into military service less complete diagnosis may have played some part in this fall, but it seems likely that restricted food-supply was an important factor. On the other hand, no decline in mortality has accompanied the severe world-wide depression, but as Joslin, Dublin, and Marks point out, the effects of economic crises are not clear-cut. The prices of foodstuffs may drop as rapidly as the rest and the fall in the consumption of food may not be large. The consumption of sugar, judging by the statistics quoted for various countries, does not in itself appear to be an important factor in the diabetes rate or an explanation of the rising mortality. This paper forms a useful review of some of the statistical aspects of diabetes incidence and mortality throughout the world. In their next paper the authors propose to discuss the way in which they believe the external forces influencing diabetes must operate.

[1] Amer. Jour. Med. Sci., April, 1934, p. 433. Their previous study was noticed in these columns on Jan. 20th, p. 141.

COLLAPSE THERAPY IN PNEUMONIA

SOME time ago Dr. J. J. Coghlan gave an account [1] of a series of cases of lobar pneumonia treated at St. Olave's Hospital, Rotherhithe, by artificial pneumothorax. He suggested that the separation of the inflamed pleural surfaces relieved pain and facilitated respiration, while the partial collapse limited the flow of blood through the lung. In his hands the induction gave rise to something very like a normal crisis; profuse perspiration set in almost as the needle was withdrawn, cyanosis and dyspnœa were relieved in 15–30 minutes, defervescence occurred in two or three hours, and the appearance of acute distress was lost. It was found, however, that control of the pneumonic process was only temporary. Of the six cases reported, three were young adult males of whom two recovered, while the third had some recrudescence of old tuberculosis in the opposite lung. A fourth case was relinquished for reasons apart from the pneumonia. The fifth was that of a child of 9, so ill on admission that she was not expected to live through the night, who recovered. The sixth was an

[1] THE LANCET, 1932, i., 13.

elderly male with myocardial failure, who was given an exceptionally large fill of 750 c.cm. as a last resort and who died, probably in spite of treatment. Coghlan's experience was novel in this country, although there were continental records of 27 cases so treated by clinicians since 1921, and his work led to some further tests in China and Mexico, a total of 50 cases in all. Dr. L. M. Lieberman and Prof. S. S. Leopold, of Philadelphia, summarise [2] all the results. The ages ranged from 6 weeks to 62 years. In 41 the pneumothorax was instituted between the second and tenth days; in the remainder so late as to be regarded as treatment for complications, rather than for the attack itself. The number of fills averaged two, the amount of air injected at a time 400 c.cm. for adults. In the entire group 47 patients recovered and 3 died. "Despite these almost incredible reports in the literature" (to use their own words), Lieberman and Leopold were unwilling to treat patients themselves without first studying the problem in animals. Accordingly they injected 36 dogs with virulent pneumococcal strains, types I. and II., into the lower-lobe bronchi by means of the bronchoscope. Half the animals were treated by artificial pneumothorax, half reserved as controls. Observations on the course of the disease included clinical study, daily leucocyte determinations, blood cultures, and X rays. No other treatment was employed. In the untreated group 5 recovered, whilst in the 13 others the disease progressed to a fatal termination; in the pneumothorax group there were 15 recoveries and 3 deaths. These experimental results confirm the clinical evidence that collapse therapy produces a picture, temporarily at least, comparable to the crisis in lobar pneumonia. In the experimental animal there seemed also to be a favourable effect on the blood-stream invasion. The Philadelphia observers do not offer any explanation for the modus operandi of this method of treatment. They do not recommend it as a routine treatment of pneumonia, but believe it may have a place in the treatment of selected cases of unilateral pneumococcal lobar pneumonia if due regard be had for the danger of circulatory depression. They agree with Coghlan that lobar pneumonia is emphatically not the disease in which to acquire experience in the technique of artificial pneumothorax.

HEALTH IN ICELAND

An official report [3] of public health in Iceland in 1932 reflects the problems of a highly civilised but very isolated community, a third of whose population of 111,000 is centred in a single town, Reykjavik. But though isolated, Iceland has been involved in the economic world depression, farming in particular having been hard hit by the constantly falling prices of farm products. With unemployment affecting a large proportion of the population, and its economic status at a low ebb, it is remarkable that in the year under review the general health conditions were above the average. Only once before (in 1928) has the general death-rate been so low, and only in two earlier years was the infant mortality lower. Among the causes of death, tuberculosis heads the list as usual (220 deaths). "Old age" comes next with 166, malignant disease with 139, pneumonia with 107, heart disease with 104, apoplexy with 78, accidents with 53, premature birth and debility of the new-born with 27, scarlatina with 17, and nephritis also with 17. Other and unknown causes accounted for 263 deaths. The inclusion of scarlet fever among the ten most frequent causes of death draws attention to the part it has played since it became endemic in Iceland at the beginning of this century. Since then it has reappeared in waves, and has sometimes seemed to be on the point of extinction. The last wave began about the middle of 1930 and has not, apparently, culminated yet. An epidemic of poliomyelitis, with 81 cases and 15 deaths, was the most serious since that of 1924. Cerebro-spinal fever was diagnosed bacteriologically for the first time in 1932, the patient being a child in Reykjavik. Prophylactic measures were at once adopted, and the disease did not spread, but its origin remained obscure. The venereal diseases seem to be on the increase, for the notifications of gonorrhœa have risen from 259 in 1923 to 372 in 1932, and those of syphilis in the same period from 22 to 50. Hitherto syphilis could hardly be regarded as endemic, the vast majority of cases arising abroad; but during the early part of 1932 it assumed the proportions of a modest epidemic in Reykjavik, checked by the end of the year. The responsibility of tuberculosis for nearly one-fifth of all the deaths should be linked with the observation that it often runs a rapid course, with meningitis as the immediate cause of 20 per cent. of the deaths. According to Table IX., 1847 school-children in 14 medical districts have been subjected to the Pirquet test whose proportion of positive reactions ranged from 11·1 to 52·5 per cent., with an average of 33·1 per cent. Tuberculosis in cattle is practically unknown in Iceland. Some years ago a campaign was instituted against favus, the Government paying for the treatment of patients at the Rontgen Institute in Reykjavik. The results have been so good that only one case is now known to exist in the whole of Iceland. Both leprosy and hydatid disease are on the wane, the number of cases of the former having declined from 56 in 1923 to 27 in 1932. The notification of cancer is still very defective; in 1923 there were 95 deaths notified as due to cancer, and in 1932 there were 133 notified deaths from cancer and ten from other malignant disease. Until the last few years, doctors seldom induced abortion. Now increasing pressure is being put on them to do so, and on p. 64 of the report an analysis is attempted of the indications for the curettings and artificial abortions undertaken in as many as 91 cases in hospital. Breast-feeding is the rule from which there are comparatively few lapses. Vaccination is compulsory. What was, perhaps, the most notable feature of public health in Iceland in 1932 was legislation affecting the relations between doctors and patients, and the activities of quacks which are now absolutely forbidden.

SYMPATHECTOMY FOR DYSMENORRHŒA

Since Cotte, of Lyons, introduced in 1925 the operation of presacral neurectomy for intractable dysmenorrhœa and other forms of severe pelvic pain, his procedure, attractive in its simplicity, has almost superseded the older operations upon the sympathetic nerve-supply to the pelvis. Three recent papers testify afresh to its value. J. Soler Julia [1] reports 37 cases of dysmenorrhœa treated in this way. In 17 sympathectomy alone was done, with complete relief in 14, improvement in 1, and failure in 2. Of the remaining 20 patients, 18 also had an appendicectomy or correction of retroversion or both; in 2 peri-arterial sympathectomy of the ovarian arteries was done as well as the presacral neurectomy. Sixteen were cured, 2 were relieved, and in 2 there was no improve-

[2] Amer. Jour. Med. Sci., March, 1934, p. 315.
[3] Heilbrigdisskyrslur. Public Health in Iceland (English Summary), pp. 152.

[1] Rev. méd. de Barcelona, March, 1934, p. 235.

ment. Julia suggests that in the cases not relieved the whole of the sympathetic supply was not removed, and points out how little is known of the exact paths followed by the sympathetic fibres to the pelvic organs. A. W. Adson and J. C. Masson,[2] whose paper contains a useful summary of the anatomy of the pelvic sympathetic, are also convinced of the value of Cotte's operation for cases of dysmenorrhœa in which the gynæcological lesions found seem to be insufficient to account for the trouble. In the 6 cases they report the results were very encouraging. J. L. De Courcy [3] lays stress upon the need for careful selection of cases, since in hysterical patients no operation is of much value, while if organic lesions are present treatment of these must precede or accompany presacral neurectomy. This author makes it a routine practice to dilate the cervix before proceeding to open the abdomen, and he reports on 21 patients, none of whom failed to get relief. These observations make it evident that presacral neurectomy holds out a good hope of cure in severe cases of functional dysmenorrhœa in which other methods of treatment have failed.

ARTIFICIAL PYREXIA

THE brief survey given in our last issue (p. 1075) of the control of body temperature suggests some remarks on artificial fever. Here a distinction must be drawn between the individual as an entity and the cells of which he is composed. Both are heated and the net result of a rise in temperature must involve many processes. At least three factors may be partially disentangled. First, the natural response of the body is overborne; reflex dilatation of the cutaneous blood-vessels and profuse sweating occur, while presumably the muscles are reflexly relaxed; such attempts at increased output and diminished production of heat are unavailing. Secondly, the passive heating of the cells must increase their rate of metabolism; this is shown by the fact that the body temperature continues to rise after the preliminary heating current has been switched off. Neymann and Osborne [4] estimate that for each degree rise in temperature the basal metabolic rate averages a rise of about 7 per cent., the rise becoming more pronounced as the temperature increases.[1] The reflex reaction is thus annulled by the direct response. Thirdly, the cells of the temperature regulating centre itself must be involved, with what results it is impossible to say. Rabbits have been reported to show a disturbance of temperature control as a sequel to artificial fever. On the whole it is surprising that patients subjected to treatment aiming at generalised pyrexia suffer, according to published results, so little from after-effects; it seems that the temperature regulating mechanism is able to withstand the rough usage. Points of interest are the height to which the temperature can be pushed, and the time during which it may be allowed to remain there. There is little to be gained, however, by discussing these until observers are agreed on the fundamental significance not only of their results but also of their technique. What, for instance, is the nature of the difference between the effects of ordinary diathermy where the electrodes are applied directly to the patient's body, and those of short-wave diathermy or radiothermy where the electrodes are not in contact but the current is induced? Both methods are capable of local or general application, both produce a local or general rise of temperature, and both appear to be useful in chronic conditions and cerebro-spinal syphilis. It is claimed, however, that the short and extremely high-frequency radiothermy waves are also effective in acute conditions where ordinary diathermy is contra-indicated, and that they heat the tissues more uniformly. Their effect, as evidenced by vasodilatation, is said to last for 24 hours. As a basis for rational therapy it is essential to discover how far these and other differences are due to differences in the site (in a microscopical sense) and effectiveness of heat production, and how far to unknown effects of the short waves entirely unrelated to temperature. Claims have been advanced that the short waves have a bactericidal action, are analgesic, and have other specific effects in different diseases and on different cells according to their wave-length. These claims are supported by in-vitro experiments where, to make a sweeping statement for the sake of clarity, one particular wave-length will heat only one of a series of solutions of graded salinity; the capacity for being heated depends on the degree of electrolytic dissociation of the solute. Moreover, the disturbance of heat regulation in the rabbit, previously alluded to, is said to have been accompanied by selective destruction of ganglion cells. Most workers seem to be agreed that electromagnetic waves of less than 30 metres in length have some other effect besides that of heat production.

Until these have been worked out there are good grounds for caution in using the method, particularly for bringing about a generalised extreme rise of temperature. Tissues may differ in their resistance not only to heat, but to some other undefined physical influences. Furthermore, apart from some notable exceptions, such as the *Treponema pallidum*, it is probable that bacteria can withstand heat better than the human body, and it is therefore questionable whether the mere attainment of high temperature is in all cases the objective of choice. It would seem more profitable to explore the effects of this promising form of therapy so as to ascertain what are the specific effects, if any, of different wave-lengths, how far these are referable to stimulation of tissue resistance and hyperæmia, how far to destruction of organisms, and what is the optimum for the affected tissue and the responsible organism in the particular case. The generation of heat, the power of controlling which has up to now captured the imagination of most investigators, might then take its place as an adjunct to treatment rather than an end in itself.

PROFESSIONAL SECRECY

SOME of the problems of professional secrecy have an air of academic casuistry as though taken from a text-book. The problems can be real enough, however, as is shown by the four following cases on which doctors obtained advice from a particular source in the past year. Dr. A. attended the confinement of a girl aged 14½ years who told him that her father was the father of her child; ought he to pass on this information to the police? Dr. B. found that a maidservant's eye was in an infectious condition; ought he to tell the girl's mistress? Dr. C. attended the pregnancy of a patient who was separated from her husband; was it permissible for him to give a report to the husband's solicitors when so requested? Dr. D. found symptoms of arsenical poisoning in a patient who said she had reason to believe that her husband was poisoning her; her food and medicine were examined and arsenic was discovered; ought the doctor to set the law in motion? This group of inquiries is taken from the recently issued report of the London and Counties Medical Protection Society, and in each case the doctor was able to obtain good

[2] Jour. Amer. Med. Assoc., March 31st, 1934, p. 986.
[3] Amer. Jour. Surg., 1934, p. 409.
[4] Neymann, C. A., and Osborne, S. L.: Amer. Jour. Syph. and Neurol., January, 1934, p. 28.

counsel. Dr. A. was reminded that the information was not of his own knowledge; he was advised that the child or her mother could complain to the police; he was recommended not to volunteer information though his evidence as to the confinement could be given if magisterial proceedings were taken. Dr. B. was advised not to tell the mistress but to suggest to the girl that she should herself do so. Dr. C. was warned to give no report on his patient without her consent; he could tell her of the request and, if she made no objection, he could state that he had attended her in the confinement but should give no report on the case if the patient preferred him not to do so. Dr. D. was told that the rules of professional secrecy might in the circumstances be relaxed. He was advised to get his patient, who lived alone with her husband, out of the house, and then to communicate with Scotland Yard. He did so and a prosecution followed. Such problems show the utility of membership of one of the societies for professional protection which have special experience in these matters. There have been occasions comparable to the circumstances of the second and third of these cases where a false step has involved expensive claims for substantial damages for defamation. In the case of suspected arsenic poisoning the position was different. The doctor owed no particular duty to the husband but was in much the same situation as a doctor who sees his patient's house being burglariously entered.

THE NATIONAL PHYSICAL LABORATORY

THE report[1] of the Laboratory for 1933 contains much of medical interest. On pp. 41–55 radiologists will find new work on the production of X rays and the rating of X ray tubes. A considerable improvement has been found in the X ray output from tubes excited with a constant potential, as compared with tubes excited with a pulsating potential of the same peak voltage. This advantage is more marked with filtered radiation. Work has been continued on the photographic measurement of X ray intensities, particularly for very weak beams. For this purpose considerable improvements have been effected in X ray sensitometry. Correlative work has been done on the X ray absorption of photographic emulsions and their X ray sensitometry. Particular importance is attached to the work done on X ray and radium dosage, the röntgen (r) being now determined to an accuracy of 0·5 per cent. The Teddington laboratory, in conjunction with the standardising laboratories in U.S.A. and Germany and the Hôpital St. Antoine, Paris, is intending to submit proposals for the realisation of X ray standards, and the calibration of X ray dosimeters, to the International Congress of Radiology to be held at Zurich in July. Experiments have also been made with a new form of dosimeter. It is important to notice that the inverse square law is not exactly obeyed for X ray tubes under practical conditions. The investigation of the calibration in röntgens of the therapeutic "B-dose" has now been completed, and an account is to be published shortly. It is found that the number of röntgens per B-dose, as measured by the colour change in a barium platinocyanide pastille, is dependent on the hardness of the X rays used, the value declining to a minimum with increasing hardness and then increasing. It was found that the same results were obtained whether the pastilles were backed with 2 mm. of lead or ½ mm. of aluminium. It is gratifying to note that work has been undertaken on the influence of the wall thickness and the length on the strength of radium needles, and that valuable results have already been obtained. An account is given in the report of an X ray study of tooth structure carried out for the Medical Research Council. As a result of the work, which deals with the structure of the enamel, the different types of enamel can be divided into three classes according to the orientation of the crystals. Two of these are associated with susceptibility to caries, and the other with freedom from the tendency to decay. An invitation to visit the Laboratory on June 26th will give an opportunity to see the basis of this and much other fundamental work. Practitioners will be glad to know that the standard of clinical thermometers submitted for test continues to improve in spite of increased numbers.

[1] London: H.M. Stat. Office. Pp. 264. 13s. 6d.

INTERNATIONAL MIDWIVES UNION

ASSOCIATIONS of midwives in ten countries and individuals from five others are attending the congress of the International Midwives Union in London this coming week-end. The congress opens with a reception by the Minister of Health at Lancaster House, the discussions taking place at the Midwives' Institute, 57, Lower Belgrave-street, S.W.1. The most important of these is the discussion at 8.30 P.M. on Monday evening, at which Dr. J. S. Fairbairn will preside, when the occupants of six professorial chairs (London, Birmingham, Paris, Lille, Brussels, Budapest) will give their opinion about the best methods of training and educating midwives. Visits will be paid to many of the maternity hospitals and institutions, and the proceedings will end with a farewell dinner on Tuesday evening.

WE regret to announce the death at Belfast on Tuesday last of Mr. Andrew Fullerton, emeritus professor of surgery at Queen's University and consulting surgeon to the Royal Victoria Hospital.

AN appeal is being made, as described in our issue of May 12th, for £105,000 to build a new nurses' home and pay block at St. Mary's Hospital, London. The sum received since March 1st is more than £42,000.

THE Royal Society of Tropical Medicine and Hygiene is holding a conversazione at Manson House, 26, Portland-place, London, W., on Thursday next, May 31st. Fellows and their guests will be received from 8.30 to 9 P.M. by the president, Sir Leonard Rogers, and Lady Rogers. Application for tickets may be made to the secretary at Manson House.

A CHADWICK lecture on the national food-supply and public health will be given by Dr. John Boyd Orr, F.R.S., director of the Rowett Research Institute, Aberdeen, at 5.30 P.M. on Tuesday next at the Royal United Service Institution, Whitehall, London. At 5 P.M. on June 14th Mr. E. A. Bowles will give a lecture in the Chelsea Physic Garden on simples and herbals.

THE series of articles on Prognosis contributed by invitation will be resumed early in June, when publication of the concluding lectures on the Preventive Aspects of Medicine at King's College has been completed.

CRAIG CONVALESCENT HOME, MORECAMBE.—Last week Mr. J. B. Priestley opened the new buildings of this convalescent home for children, named after Mr. Thomas Craig, of Bradford. Since the home was first opened 11,400 children have passed through it. A fortnight's stay has added an average of 2 lb. to the weight of each child.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress at King's College Hospital Medical School

XXIII.—THE PREVENTION OF MENTAL DISORDER

IT might well be thought that the province defined by the title of this lecture is large enough, but I intend to widen it by including reference to mental defect. Mental defect in the modern sense of the term, as distinguished from mental disorder, may be defined as *arrest* of mental development due to any cause, whether pre-natal or post-natal, and in the latter case operative before the age of 18.

The distinction between mental defect and mental disorder—i.e., anomaly in those who up to the age of 18 have been normal—is entirely a legal one. It is of practical use in ensuring that children with mental troubles of post-natal origin shall be treated with other children whose defect is pre-natal (rather than with adults). But the distinction is not a scientific one from the standpoint of ætiology, and for purposes of prevention as opposed to cure there is little distinction between the problems of mental defect and those of mental disorder. This is obvious in respect of certain organic conditions—e.g., mental troubles due to syphilis or epilepsy, and of gross "functional" psychoses such as schizophrenia.

It is essential to reality that one should emphasise this continuity of defect and disorder. One of our main problems is the degree in which establishment in childhood of faulty habits of reaction are dependent on innate factors and even intellectual ones; on the other hand, it is necessary to consider how far such habits are responsible for later neuroses and psychoses.

Further, I am obliged to deal both with what are termed neuroses and psychoses. Here we have a semi-popular distinction based on legal and administrative grounds. It is a distinction of some slight practical value if used only by those who appreciate its limited meaning, but may be a danger. Some years ago it would have been true to say that psychoses were such mental disorders as in the poor usually led to treatment in an asylum under certificate, while the neuroses were those which in the poor were usually not treated at all. Changes in law and language would now compel one to say instead that neuroses are mental syndromes of such form and degree as to be less likely to necessitate legalised treatment. But neuroses are due in varying degree to factors of the same four main groups (see below) as psychoses, and the problems of their prevention are the same. Clearly quantitative distinctions—as that in neuroses previous mental experience plays a relatively greater part in causation; that the affection of the personality is more limited; that insight is apt to be greater; and that psychological treatment of specialised kinds may sometimes be more effective—would not justify separate consideration of the neuro-psychoses and the psychoses; and they cannot even be separated for practical purposes except by contrasting extreme cases of either group.

In taking as my topic mental disorder and defect, I am therefore including all conditions in which anomalies of behaviour and of the consciousness associated with it are a prominent feature. I need hardly say that I am including organic as well as functional mental troubles, since in my view "organic" cases are merely those in which the physical basis is obvious, while "functional" are those in which for the present it is obscure. The distinction is one based on ignorance. The prevention of these conditions must still be propounded as a set of problems. No such record of general achievement is possible as in the case of tuberculosis. Little or no statistical evidence is available in support of the efficacy of any measures applied to the individual in preventing the onset of mental disorder.

To judge from statistics, certifiable insanity would seem as little preventable as cancer. Figures seem to indicate that the number of first admissions to institutions for certified insanity has in proportion to the population not materially decreased in the past 50 years. These patients with certified insanity are the sole cases which can be clearly identified, and therefore the only ones concerning which comparison is available.

Despite the continuity which I have stressed between the mental troubles of adult and child, between neuroses and psychoses, between organic and functional, I do not mean that all mental disorder is one and indivisible.

For example, there has been a considerable reduction during late years in the certified admissions suffering from the specific results of alcohol and syphilis. Owing to former fallacies of diagnosis, exactly comparable figures are unobtainable, but the general conclusion seems certain. But if this is so, then this reduction must be balanced by increase in the total number of cases due mainly to other factors. As we are dealing entirely with first certifications, the figures cannot be affected by such points as altered standards of fitness for discharge or changes in the institutional death-rate. Nor in London, at least, can any explanation be based on an increased proportion of old people. It is true that there is not only an absolute but a relative increase in the number of the old. Among such there occur a disproportionate number of psychoses fitting the patient for treatment in an institution, and of late, owing to improving repute of institutions, there has been a steadily increasing tendency on the part of the young to agree to the treatment in hospitals of those mentally enfeebled by age. But that would not affect the London figures for certified insanity because the senile mental cases are dealt with apart.

The persistence, almost unchanged, of the incidence of certified insanity is one of the worst facts of medicine.

There has been a vast improvement in the conditions under which patients are treated. That we possess the power to alleviate suffering is certain; but whether we can even abbreviate is very doubtful; assertions about the shortening effect of early treatment are full of statistical fallacies. The limited extent to which it is possible to prevent a first or subsequent attack will be discussed later. Any power to eradicate the constitutional tendencies underlying the major psychoses is still to seek. The situation is somewhat better as regards the neuroses or minor mental troubles, but the difference is far less than the enthusiasm of some optimists would lead one to believe. Mental prophylaxis is therefore an unsolved problem.

Prevention of any form of disease necessarily involves consideration of the factors giving rise to it. Briefly, in mental disorder or defect of any kind these factors may be placed in four groups:—

(1) Anomalies of innate make-up.

(2) Anomalies of the changes incidental to particular ages or epochs of life.

(3) Exceptional mental experience, whether recent or remote.

(4) Gross physical influences.

The form of every mental process must necessarily

be the resultant of factors belonging to all four groups—i.e., heredity, epochs, mental experience, and physical influences. Theoretically only one factor or group might be operative, but in practice this is never so, and it is thus necessary to consider factors drawn from all the groups.

True prophylaxis perhaps should mean measures taken in advance of the occurrence of first symptoms and is theoretically distinguishable from early treatment designed to arrest progress or recurrence. If this distinction is accepted, however, there is rarely an opportunity for individual prophylaxis in the strict sense. Multiple factors are almost invariably associated in determining occurrence of psychoses and neuroses. One of these factors is commonly a long-standing, if not innate, constitutional tendency. As a rule, to eradicate this is beyond one's powers. One's usual goal is reduction of overt manifestations; in fact, the keeping of such in check, either before or after a first attack, may be all that is possible.

Having established the range of conditions to be prevented and the nature of the aim intended by the term "prevention" it is necessary to consider how this can be pursued. As always, prevention must here include *collective prophylaxis* directed towards the interests of the many and *individual prophylaxis* in any case where special risk is anticipated.

Collective Prophylaxis

The essential preliminaries of any progress in prevention of mental disorder are: (1) Education of the whole medical profession; (2) Provision of trained personnel; (3) Research; (4) Provision of suitable institutions.

MEDICAL EDUCATION

On the lack of proper education of the medical profession in regard to mental disorders depends the composure with which they as well as the public view the present incidence of insanity and mental defect.[1]

Of all children born, about 1 in 35 will at some time be certified before death. The number of those for whom at any given moment some sort of legalised special provision has to be made on account of mental disorder and defect approaches half a million. The country is spending about ten millions a year on care of those suffering from mental defect and disorder and less than ten thousand on any research to prevent these.

It is necessary for any progress towards general prophylaxis in England that the mass of the profession who are not specially concerned with mental disorder should have a greatly increased consciousness of the size of the problem and should use their influence to rouse the public. Of late years a steadily growing interest has prevailed among the leaders of the profession, but this interest is not widespread among practitioners.

The general practitioner could hardly be expected to find the time or receive the training to carry out active measures of individual prophylaxis. But he should be trained, as he is in respect of abdominal emergencies, either to recognise the cases that need specialist intervention and where to go for it, or at least where to get a sound opinion regarding the necessity of treatment. It is just as important to recognise the vast number of neurotics in whom intensive treatment is to be avoided as it is to identify those who need it.

[1] In Turkey, under the wise rule of the Ghazi, the law forbids anyone to practise as a specialist in mental disorder unless he has passed the necessary examination after two years of supervised clinical work with patients of all kinds. Perhaps some day England may emulate Turkey in this respect.

TRAINED PERSONNEL

Psychiatrists.—As regards the medical profession, the other requisite is the provision everywhere, for consultation on behalf of the poor, of specialists for whose qualification an official body has vouched.[1]

Psychiatric social workers.—Social workers with special training for the investigation and correction of the setting in which breakdown tends to occur are indispensable to modern psychiatry. Their coöperation not only makes it possible to deal more effectively with the individual, but is also of great value in research.

RESEARCH

Organisation of research is by far the most important need of psychiatry in the near future. Special provision for its endowment was made in the Mental Treatment Act three years ago, but so far the amount spent is ridiculous in relation to the expenditure on the maintenance of even those legally recognised as suffering from mental disorder or defect.

Of late years there has appeared a definite willingness to spend money on treatment of early and minor mental disorders in out-patients and wards apart from the custody of the insane. But the main lack of all such psychiatric clinics is a treatment which is more than palliative, symptomatic, and expectant—i.e., awaiting natural recovery. Perhaps as regards treatment the situation is no worse than in respect of typhoid. As regards prevention in the full sense it is far worse.

Personally, I think that for a generation much interest has been squandered on studies having none of the qualities of science and useless for prevention because calculated at most to elucidate reasons for the form rather than for the occurrence of mental disorder and defect.

SUITABLE INSTITUTIONS

Where should a programme of education, research, and preventive psychiatry be carried out? My view is that in Great Britain, as in all progressive countries of the world, the university psychiatric clinic should be their nucleus. Such clinics should provide for the treatment on a voluntary basis of recoverable cases of mental disorder of every kind and degree. They should deal with children as well as with adults and, of course, with both in- and out-patients. As the public learns to use such clinics, their work will become increasingly preventive.

In their fully developed form as they exist in Germany, Holland, and in the more advanced States of America, such clinics form a part of every university which is attempting clinical teaching of medicine. Excellent pioneer service has, of course, been done in detached out-patient centres and at independent child guidance clinics as well as in general and neurological hospitals. But arrangements for education and research cannot be scattered and multiplied. Moreover, it is impossible to treat within the wards of a general hospital a representative collection of patients illustrating even such a range of neurosis and psychosis as the future practitioner will meet. In the absence of psychiatric clinics English students will presumably continue to be taught psychiatry mainly by a few demonstrations on the chronic insane.

There appears to be no chance that the money needed for thorough organisation of preventive psychiatry throughout the country can be obtained from voluntary sources; it will have to be found by local authorities. Provided that medical opinion has a proper weight in control there seems no disadvantage in this. University psychiatric clinics will presumably have to be municipal institutions, though in close connexion with the general hospital

and the rest of the medical school. In non-university centres they should be associated with voluntary or municipal arrangements according to local conditions.

COLLECTIVE PROPHYLAXIS OF ORGANIC MENTAL DISORDERS

It is now necessary to deal with the problems of prevention in more detail. As a preliminary to the most convenient mode of discussion of them one must define a little further the meaning of the terms "organic" and "functional." By an organic case is meant merely either one in which an essential physical factor is operative (e.g., alcoholism); or in which during life or after death structural or biochemical change can be detected which is constant and characteristic and not merely the consequence of behaviour; or in which there are bodily symptoms, such as fits, which are independent results of the same process. The distinction between functional and organic, as mentioned, is one based merely on ignorance. It has, however, considerable practical value and in detailed discussion it will be better to forego a strictly ætiological order, and to isolate organic conditions before approaching the still more difficult problems of functional disorder.

In the last report of the Maudsley Hospital 33 independent organic conditions are noted as main factors in various cases among the 10,000 there tabulated. But of these 33 only 6 post-natal factors play a part in as much as 1 per cent. apiece of the total of cases. Two out of these 6 can here be ignored from the standpoint of prevention—viz., senility and epidemic encephalitis, the latter because the disease which is the source of fresh cases is now so rare. The remaining conditions are arterio-sclerosis, idiopathic epilepsy, alcoholism and neuro-syphilis.

Arterio-sclerosis.—The early occurrence of arterio-sclerosis is a problem of general medicine and its prevention needs no special discussion here.

Epilepsy.—Collective prophylaxis of this could only take the form of eugenic measures which have hardly been attempted.

Alcoholism.—There has probably been a reduction of all morbid consequences of drinking, including those psychoses specifically due to its toxic effects, to about one-third of their pre-war frequency. In England this has been a political rather than a medical achievement, brought about by making alcohol dearer and harder to get. The triumph has been won in a contest between boost by the Trade and cost as raised by the State, rather than by precepts. The result is, of course, more satisfactory than prohibition proved in America or is likely to prove in a country with similar political organisation. It is probably less satisfactory than a scheme of State sale such as exists in Sweden and Denmark. There alcoholic addiction of such degree as to produce lasting psychotic effects has been almost restricted to those who would be unmistakable psychopaths apart from its influence, but in England the political influence of "the Trade" would presumably render State sale so unlikely to become a matter of practical politics as hardly to be worth discussion.

Syphilis.—A disproportionate reduction in general paralysis soon after the war was largely due to the death of 800,000 men mostly between the ages of 20 and 40 and naturally including a high proportion of the potential general paralytics of the next ten years. But reduction of incidence of general paralysis goes on and is probably due in the main to decrease in the number of primary infections with syphilis.

There seems some reason to believe that the decrease of primary syphilis may be in some measure connected with the reduction of the vogue of prostitution, but no reason to think that this is attributable to an increase in chastity—rather the contrary. Probably the main factors are two: increased readiness of application for treatment and early abolition of infectivity by arsenical treatment.

COLLECTIVE PROPHYLAXIS OF FUNCTIONAL MENTAL DISORDERS

It is necessary to consider prevention in relation to the main factors determining the occurrence of functional mental disorder without any reference to details of its form.

Heredity.—Exact figures concerning the probability of inheritance of this or that functional syndrome are probably fallacious. Errors may depend on the fact that groups of cases exhibiting the syndrome include a medley of conditions, as in the case of epilepsy. Conscientious selection for research of so-called unmistakable cases may isolate one sub-group in which the transmissible factor is most potent. Published observations concerning the chances of transmission may thus be true for the particular sub-group investigated. They seem too high for the clinical experience of all the cases showing the syndrome. Nevertheless, while it is impossible at present to evaluate exactly the influence of heredity in determining psychoses and neuroses, no reasonable doubt exists that this is great. The conclusion seems distasteful to the omnipotent type of psychotherapist. To the reasonable it is unobjectionable. Innate susceptibility is, of course, only one factor. Other post-natal influences are responsible in varying degree and open to prevention and treatment.

At present there seems little hope of constructive eugenics of any sort likely to influence materially the incidence of mental disorder in a wide sense.

Sterilisation.—The passage of a measure to legalise voluntary sterilisation would be an excellent gesture affirming the claim and the intention of the human race to determine to the best of its ability its own genetics as well as its own environment. Further, permissibility may be of great value in individual cases but not in collective prophylaxis. In this connexion the following points should be noted:

(1) For many reasons legislation can only properly allow voluntary sterilisation. Among other grounds is the fact that it is impossible to define conditions which are always transmissible. Such definitions would be necessary in order that a schedule of groups for the compulsory sterilisation might be tenable scientifically.

(2) Present sentiment would not tolerate eugenic sterilisation being legalised except where the abnormality likely to be transmitted is a very gross one. Any idea that sterilisation as now proposed may help to prevent neurotics and members of the so-called social problem group from breeding their kind is quite misplaced.

(3) Some safeguards are absolutely necessary in the interests of prospective applicants for sterilisation. But any tolerance of the operation will certainly be accompanied by safeguards intended to prevent conception for reasons other than those officially approved. In practice, to get sterilisation legalised at all, it will certainly be necessary to advocate the association of permission with safeguards so numerous as to render any influence on the collective incidence of mental defect and disorder almost imperceptible.

Legalisation of abortion.—For eugenic reasons, even under safeguards like those proposed in connexion with sterilisation, would probably do much more than the latter; many of those whose progeny is undesirable would be far more likely to accept operation and all the trouble connected with it on account of an actually forthcoming child than on account of purely hypothetical ones. But even legalised abortion would never make any wholesale impression on the problems of psychiatry so long as it was only tolerated for eugenic reasons under safeguards. As with sterilisation, this would necessitate its restriction to those with family history of such gross disorder as is proven by certification or similar evidence. The very continuity of minor with gross mental disorder will therefore render engenic operations of either sort largely ineffective to prevent even these gross deviations, and totally so in respect of the minor degrees of mental defect and disorder. Yet as social

problems these minor degrees are really more important than the grosser conditions.

Far more might indirectly be achieved if abortion were legalised for economic reasons. It is conceivable that the community might some day revolt against the view that those who are unable to support themselves have an unlimited title to present to the community offspring which are reasonably certain to be on balance liabilities rather than assets.

Special ages and epochs of life.—General measures to render the special biochemical aspects of any of these epochs less productive of mental disorder do not exist. It is a striking fact that practically nothing is known as to the biochemical changes which no doubt form the common foundation of the mental disorders of pregnancy. The same is true of the puerperium, of the menopause and other epochs, and therefore no general guide to prevention of these exists.

Mental Experience. (*a*) *Psychogenesis.*—In the main child guidance clinics deal *individually* with psychogenesis in the young. But there are many other agencies trying collectively to decrease the stresses which affect the potential patients of these clinics.

The prevailing tendency to emphasise the importance of the impressions of infancy would throw back the critical period to a point when not even a child guidance clinic could directly aid in prevention. This would render the education of prospective parents the sole hope. As one listens to the recitals of the early experiences alleged to produce such dire psychopathic results they seem a little banal. This is equally true whether they are considered on a Freudian or Adlerian basis. Personally I find it hard to accept as adequate such events as removal from the breast before satisfaction or from the stool while lingering over defæcation. Many of the instances of pampering or neglect or of pampering followed by neglect which are cited as explaining neuroses, psychoses and delinquency are trivialities such as have happened to many of us and are obviously insufficient without invoking another and exceptional factor to make them effective. To me it seems likely that the child while impressionable has also far more tendency towards return to the normal than such theories suggest, and that much more persistent influences are necessary to produce lasting effects. This is at least the more hopeful view, implying that the child guidance clinic has a chance to intervene while the mischief is in the making, rather than before it is done and needs such elaborate undoing as must be available for few.

While the child guidance clinic is fully justified by its effect in reducing the actual unhappiness of children, it must be remembered that there is no evidence which could possibly be called scientific as to how far such troubles as it treats are really the precursors of mental disorders in adults. It seems that a large proportion of well-defined adult psychoses, whether schizophrenic or manic-depressive, are wholly devoid of any history suggesting such relation. The connexion is apt to seem more definite in what one may call anomalies of character—including delinquency. But even here it cannot yet honestly be said to what extent any treatment in childhood can really eradicate the tendencies.

(*b*) *Sex experience and sex education.*—To me the Freudian generalisations concerning the universal and specific relation of various clinical syndromes to particular types of sex experience during early childhood seem to be based on inadequate evidence and illogical deductions. But it is possible that exceptionally such experience may so condition a child as to predispose later to the development of one of the abnormalities such as masturbation, homosexuality, or excessive erotism, which with multifarious reactions to such a tendency constitute a source of unhappiness to a good many. As to this, perhaps the first general prophylactics needed are the steady growth of a morality that is rational rather than traditional, honesty among adults, and proper education of the child. From the standpoint of the neurotic it might be a great advance if what is termed morality could be made a question of manners, and departures from it were regarded rather as crudities than as sins. Those at least who are happily married will not regard monogamy as needing enforcement by terror. There is good reason to believe that in Russia in a generation brought up entirely as agnostics and in a milieu where premarital chastity is treated as a matter of taste, the large majority of girls at least are virgins on marriage, and the greatest possible freedom of divorce leaves it still quite exceptional.

The knowledge of the frequency of masturbation in both sexes and the consequent absurdity of ascribing to it the physical and mental disorders formerly used as bogies is now widespread among doctors, but such terrors still play a large part among neurotics and psychotics of many types.

Homosexuality, though far less frequent than masturbation, is fairly common in both sexes. In a majority perhaps it depends merely upon opportunity and is transient. In others where strong attachment to a homosexual object (or other perverse tendency) is formed during the first consciousness of sex feeling, the perversion seems more likely to persist. But it may well be that such persistence only occurs where much earlier conditioning or innate disposition exists. It would be interesting to know from a standpoint of prevention the relative frequency of transient or lasting homosexuality on the one hand in co-educational and on the other in ordinary schools, but I know of no reliable statistics bearing on this question.

Individual Prophylaxis

Space forbids anything but the most cursory reference to individual prophylaxis, which can be considered under the same headings as collective prophylaxis.

MENTAL DEFECT

If, as I stated earlier, checking of progress and consequence of a primary disability can legitimately be brought under the term "prevention," then a good deal can be done in mental defect. It is apparently a proven fact that among aments whose defect is not severe enough to need an institution, those who have been brought up at special schools or under statutory supervision are far more stable in every respect. They are less prone to emotional storms, hardly ever become criminal or immoral, and are probably less prone to the supervention of an acute psychosis upon the defect. In view of all this, strict ascertainment of aments outside institutions and their suitable upbringing is essential. It is a pity that recently, with a view to "economy," the Government has directed that no more places in special schools are to be found and that ascertainment of defectives has been discouraged.

ORGANIC MENTAL DISORDERS

There is little or nothing to be said or done about averting or arresting mental symptoms in those liable to them through *old age*, *arterio-sclerosis*, or *epidemic encephalitis*. With regard to the last, drugs such as hyoscine, which relieve the motor symptoms, have little influence on mental sequelæ of any kind. To some extent the same is true of luminal in epilepsy. Its effect in checking motor convulsions is greater than in averting petit mal attacks or paroxysmal mental attacks. But luminal may slow the sort of

deterioration which is apt to develop especially in the young when motor fits are very numerous. On the other hand the liability of heavy dosage with bromide to increase this should never be forgotten.

General paralysis.—Measures directed to reducing incidence of syphilis have been discussed under general prophylaxis. So far as I know little has been done with regard to the special problem of averting nervous sequelæ in those known to have suffered with syphilis.

Alcoholism.—Personal prophylaxis against alcoholic psychosis means early cure of addiction in those in whom it has arisen. With regard to this the position is deplorable. Personally I disbelieve entirely in all treatment outside an institution, whether psychological or by drugs, except in the very rarest instances. There are no special institutions for the poor and some at least of those catering for the self-supporting are expensive but unsatisfactory. I believe that there will never be progress without a change in the law. The modern tendency is towards treatment on a voluntary basis wherever possible, but such a method seems futile in established addictions. The provision whereby an addict could legally bind himself to remain under treatment voluntarily but for a minimum of several months seems to be falling into disuse. Considering the havoc which alcoholics play with the lives of others as well as their own the law should provide that on a second occurrence of incapacity from alcoholism requiring medical treatment commitment to an institution for a suitable period should follow regardless of certifiability.

INDIVIDUAL PROPHYLAXIS OF FUNCTIONAL MENTAL DISORDERS

Heredity.—While there is little hope that the collective prevalence of functional mental disorders in the community will be much checked by such steps as the legalisation of eugenic sterilisation or even of abortion, there is more hope for the growth of at least a family conscience that will make members of stocks in which there is concentration of neuropathic heredity more chary of reproducing their kind. There seem no reasons why they should be denied marriage, intercourse, or the permanent security that this will be infertile which they desire and which sterilisation will give.

Epochs.—Perhaps the main item worth discussion here is prevention of mental disorder arising during pregnancy, during the puerperium, or from subsequent responsibility for the child. One should include here aggravation of pre-existing disorder. Quite apart from any question of eugenic intervention on account of expected quality of offspring, there is no clear definition in law as to what justifies the production of abortion in the interest of the mother. It is perhaps inadvisable to attempt definition but the standard in practice is becoming more liberal. Perhaps this tendency will grow as the right of the law (which has given up the campaign against contraception) to force a woman who has conceived to bear a child she does not want begins to seem less axiomatic.

Mental experiences.—Personally I disbelieve in all constant psychological situations as the specific cause of particular clinical syndromes. On the contrary, I believe that every syndrome in so far as isolation is justified at all corresponds to a reaction-pattern of the organism, each of which can be impaired, released, or overactivated for a multitude of reasons, some "functional," others "organic" as above defined.

Among such reasons are all situations which in humanity can cause disturbing emotions. This disposes of the question of summary rules for the prevention of psychogenetic mental disorders. I would rather suggest some cautious general principles of a negative kind. For all prophylactic purposes psychiatry at present is grossly handicapped by lack of any indicators of susceptibility, whether innate or acquired, whether quantitative or qualitative. It is probable that linked physical characteristics might be more objective and useful, but the characteristics described by Kretschmer do not seem to meet requirements. In the absence of such indicators, great caution is necessary to avoid doing individuals and the community the worst possible disservice by prophylactic enthusiasm.

It is neither possible nor desirable that the community should adapt its requirements and its rewards to the weaknesses of the neurotic. The quest of safety for the neurotic almost inevitably means renunciations, and these renunciations may themselves eventually bring stresses at least as great as those they were meant to avert.

That the danger of fostering neurosis by attempts to prevent it or cure it is a reality is shown, for example, by many cases of war pensioners. I entirely agree with the conclusion reached by Dr. S. A. Kinnier Wilson in an earlier lecture in this series, as to the inadvisability of encouraging neurotics to discuss their symptoms and their causation. For a very large number of neurotics, stoicism is still the best course to recommend.

Much of the talk about encouraging seeking of medical advice upon the first appearance of symptoms is wholly wrong in the case of neuroses, whatever may be true in case of symptoms suggesting possible cancer or tuberculosis. If one could be sure that in a large majority of cases patients would be dismissed with reassurance and encouragement, one would be much more easy about the ultimate result of the multiplication of centres for psychiatric advice. As to the giving of collective counsel upon details of mental hygiene directly to the public by lectures and pamphlets (as opposed to urging resort to expert advice), in view of all the possibilities of misunderstanding and misapplication, it seems to me likely that on the whole this will do more harm than good.

EDWARD MAPOTHER, M.D., F.R.C.P. Lond.,
Physician in Psychological Medicine, King's College Hospital; Medical Superintendent, Maudsley Hospital.

ST. BARTHOLOMEW'S HOSPITAL.—The report of the treasurer, Lord Stanmore, shows that in 1933 the number of new in-patients was 10,333, a reduction of 476, whose average stay was 21·4 days. At £225,000 there was a net decrease in income of £243; on the other hand, the expenditure—£194,000—fell by a fraction over £3000. By arranging for old and new cases and male and female patients to attend at different times much unnecessary waiting has been saved to out-patients, who numbered 90,311. Some remarkable figures are contained in the pharmacist's report. In 1913 there were consumed (fractions omitted) 235 gallons of brandy; in 1933 the quantity was 11. Port fell from 216 to 4 gallons; whisky from 1¼ gallons to nil; burgundy from 9½ to less than 1½; and quarter-bottles of champagne from 155 to 17. Particulars are given of the sale of a small farm in Kent which had produced a net annual income of £5; the invested purchase money yields over £32. In the year ended with July, 1933, there were 964 students attending the medical college. The nursing staff now numbers 404, and of 91 entrants for the first year examination of probationers 84 passed. The Charity Commissioners have sanctioned the expenditure of a sum not exceeding £150,000 for the erection of the new medical block, subject to the replacement of the money in 60 years by means of a sinking fund.

SPECIAL ARTICLES

MUNICIPAL HOSPITALS

IN opening a discussion, at the annual meeting on May 13th of the Socialist Medical Association, on the

Present Scope and Future Development of Municipal Hospitals

the president, Mr. Somerville Hastings, said he wondered how many of the Members of Parliament who voted in favour of the Local Government Act, 1929, really appreciated what they were doing. Rightly used it was the key which would open the door to a complete and unified municipal hospital system. The Act, although full of uncertainties and anomalies, did transfer the powers under the poor-law from small local boards of guardians to county councils with an instruction to them to sit down and think out how best to utilise their new powers. As far as the development of hospitals is concerned, no increased powers were given. Section 131 of the Public Health Act, 1875, stated that "any authority may provide for the use of the inhabitants of their district hospitals or temporary places for the reception of the sick," and the only later addition was the inclusion of pregnant women amongst the sick. It seemed curious that until quite recently hardly any use has been made of these powers, with the exception of Widnes and Barry, which provided themselves with accident hospitals, and Bradford, which took over a poor-law infirmary and administered it as a general hospital.

Local authorities had now been set thinking in one of three directions :—

(1) Many authorities had left their hospitals as poor-law infirmaries much as they found them, so that anyone who took advantage of treatment there became technically a pauper. The normal means of securing admission was to apply to the relieving officer for an order, but the medical superintendent could in an emergency admit any patient on his own responsibility.

(2) A few authorities had made a declaration that any assistance provided should be by virtue of the Public Health Act, 1875.

(3) A much larger number of authorities (including London) had appropriated the hospitals and were running them as municipal hospitals under the 1875 Act. The term "appropriation" may need a little explanation. By means of this power a council can take over property or land and use it for any agreed purpose—e.g., providing hospital treatment according to the powers permitted by the Public Health Act 1875.

Before making a declaration (2) the authority had to be certain of sufficient accommodation and facilities ; for once a declaration were made, it would be illegal to treat any sick person in a poor-law institution. If appropriation (3) were decided upon, the commitments were less serious and the advantages still very considerable. In the first place, admissions, except in the case of the destitute, were made by the medical superintendent, the usual method being for the patient's doctor to ring up or write to him explaining the case. It was, he thought, a disaster that under the Act the cost of maintenance and treatment for any disease other than infectious had to be recovered from patients who could afford to pay for it. If the hospital was appropriated, consultation with the Ministry of Health over details of administration was not required, and the authorities had much greater freedom.

In whichever way severance from the poor-law was accomplished it opened enormous possibilities of development, especially in urban areas where the population was considerable and the hospitals not too far apart. Specialisation became possible ; certain wards in one hospital could be set aside for the treatment of cancer by radium and X rays, in another hospital for eye cases ; facilities could be provided for thoracic surgery or bronchoscopic work in a third, and so on. It became an easy matter to transfer patients from one hospital to another or to obtain the services of any type of specialist needed. If a severe epidemic broke out and the isolation hospitals were filled a block of wards, or even an entire general hospital, could be evacuated and used for infectious disease. Municipal hospitals could be used as clearing houses for the observation and sorting out of cases of tuberculosis and for minor operations on school-children.

A local authority could not legally refuse admission to any destitute patient if his medical necessities demanded immediate hospital treatment ; accordingly in calculating the number of beds required, the highest possible and not the average demand had to be kept in mind. Consequently in the summer months a good many beds were vacant which could be used for operations which were not urgent. A consultative out-patient department then became essential. Whether such a department came within the terms of the 1875 Act as "a temporary place for the reception of the sick" was uncertain, and it was still more doubtful whether a local authority had any legal right to make a charge for out-patient treatment. Nevertheless it was essential to develop them at municipal hospitals, and where geographical conditions made this possible it would be convenient to carry out there the tuberculosis, V.D., and child welfare work of the authority. School clinics could be held there, and as far as circumstances permitted, the district medical officer—generally a member of the resident staff—should see patients there. In a word the out-patient departments of municipal hospitals and their branches could be developed into the medical centres of the district.

The unification suggested should prove of value for research and for medical education. Instruction in fevers had long been given in hospitals controlled by local authorities and everything possible should be done to bring the stimulating and critical influence of students within the walls of all the hospitals. There was in fact nothing to prevent the development of medical schools in association with municipal hospitals where facilities for teaching exist. Where they were developing on these lines, the confidence of the public in them was steadily increasing and they were being preferred by many to the voluntary hospitals. The public were beginning to feel that the hospitals belonged to them, that they could go there by right of citizenship, and not as a charity, and should anything go amiss that they had the right of protest through their elected representatives. In depressed areas local authorities had even been approached by voluntary hospitals with a request to be taken over.

The Local Government Act, 1929, came into being because intelligent administrators were impressed by the wastefulness of two systems of treatment—one for poor-law patients, and one for the public generally. If, Mr. Hastings concluded, the same Act was the means of freeing the public from the equally wasteful system of dual hospital administration, it would have proved itself of even greater value.

ROYAL INSTITUTE OF PUBLIC HEALTH

THE NORWICH CONGRESS

THIS year's congress was held at Norwich from May 15th to 20th, and was notable for the interest and originality of the communications made to the various sections, as well as for the pleasant excursions and "educational visits" which are among the valued amenities of these annual gatherings.

We noticed last week (p. 1074) the presidential address on conditions of employment. Among the discussions held by the section of state medicine and industrial hygiene was one on the

Milk Problem

opened by Dr. T. RUDDOCK-WEST, county medical officer of health for Norfolk, who said that the small amount of milk consumed per head in this country was attributable to (1) failure of the general public to appreciate the dietetic value of milk, and (2) the reluctance of the medical profession, while unanimous in opinion on the high nutritive value of milk, to advise its use, owing to the unsatisfactory state in which it reaches the consumer. Unless raw milk could be produced free from pathogenic organisms the only safeguard appeared to be universal pasteurisation. In either case it was necessary for the milk to be clean. Unfortunately the Milk and Dairies Acts and Orders had not been enforced rigidly. Legislation governing the production and sale of designated milk needed amendment. Dr. Ruddock-West said that milk naturally fell into one of two categories, clean milk and dirty milk, or in other words, tested and non-tested milk. In regard to tested milk the regulations in force in respect of Certified milk would meet the needs with certain modifications :—

(*a*) The herd should be tested against abortus infection every three months and reactors eliminated.

(*b*) Control should devolve upon the county councils and county borough councils in whose area the farms are situated.

(*c*) Farmers should be encouraged to produce tested milk and only a nominal fee, if any, charged for a licence.

Milk not conforming with the standards laid down should not be sold for human consumption unless it has been efficiently pasteurised, boiled, or dried. It was to be hoped that ultimately all milk would be of the tested class. Pasteurisation properly carried out would protect the consumer from the danger of infection with pathogenic organisms, though to adopt it universally without exploring other methods would be tantamount to acknowledging failure. Should other methods of dealing with the problem not prove efficacious there was always the last resort of pasteurisation. Dr. Ruddock-West was inclined to agree with the statement in the Ministry of Health Memorandum on Bovine Tuberculosis in Man, that the campaign in favour of clean raw milk must be regarded as of great potential value, and the unofficial grading of milk would constitute an important element in any comprehensive scheme for improvement in the milk-supply.

To a discussion by the section of women and children and the public health Mr. H. A. BRITTAIN, orthopædic surgeon to Norfolk county council, contributed the opening address on the

Crippled Child

He spoke especially of the care of surgical tuberculosis from the hospital aspect, and devoted much attention to the difficult problem of diagnosis in very early cases. He was averse from postponing treatment until diagnosis was obvious to all, though this was to the benefit of statistics. At his hospital early doubtful cases were treated in various ways. In the first place the massage department, according to Platt, provided excellent diagnostic as well as therapeutic facilities; but the patient must be seen by the surgeon at least once a week. He had been confronted with a cold abscess on the tarsus after a month's massage. Absence of improvement on treatment should arouse suspicion, and any increase in the severity of the symptoms should clinch the diagnosis. Secondly, for the case which is almost certainly a strain, rest in bed at home was recommended for two to four weeks. If then symptoms had not cleared up the period of rest was repeated, and then if positive signs of a joint lesion still remained the case was treated as one of tuberculosis. In the third place, chiefly for the patient who might have an early pseudo-coxalgia, six weeks on a Thomas splint or in a plaster spica usually resulted in a complete loss of muscle-spasm and pain, but symptoms would recur in the tuberculous patient. These might seem rather elaborate precautions, but once a patient had been diagnosed as tuberculous he must be treated to the very end, remorselessly, in spite of the apparent immediate improvement. He had been taught the doctrine of immobilisation for at least one year after all pain and muscle-spasm were absent, and as his experience increased he found this period to be the minimum of safety. Mr. Brittain spoke also of the problems of the treatment of the established case, and of the residual or quiescent case in a general as opposed to a special hospital.

To this section also Miss M. F. FORRESTER-BROWN, visiting surgeon to the Bath and Wessex orthopædic hospitals and county clinics, spoke on the

Organised Treatment of Motor Accidents

She pleaded for the earlier treatment of road injuries, which were so numerous and serious as to call for a special scheme of treatment. Information not at present available but essential to the solution of the problem included: (1) how many deaths were instantaneous, and how many occurred later and would have been preventable by more efficient treatment; (2) the degree and nature of the disabilities. Road accidents had much in common with war wounds. Organisation was needed for three stages: (1) the saving of life and limb, (2) repair of structure, (3) restoration of function, including working capacity. She pointed out the futility in rural districts preliminary of taking an accident case direct to the surgery of the local general practitioner, who more often than not would be out on his rounds. She reviewed the facilities available after the preliminary first-aid services rendered by the A.A., R.A.C., and, on certain occasions, by the Red Cross, comparing cottage hospitals to casualty clearing stations, the general hospitals to the base hospitals, and the orthopædic hospitals to the special hospitals, where the services of surgeons skilled in dealing with head and chest injuries would be available. A service possible in time of war should surely be possible in time of peace, and general constructive investigation was required.

Mr. MICHAEL W. BULMAN, consulting obstetrician and gynæcologist to the Norfolk county council, gave an address on

Abnormal Childbirth in the Rural Home

He discussed the causes of difficulty in rural midwifery—notably distances, home conditions, prejudice

of patients against hospital confinement, and lack of trained nurses. With reference to prejudice, he said that many patients expected to be delivered in their own homes and saw no reason why the doctor should require special assistance. A doctor who frequently sent for a colleague to give an anæsthetic or who often advised his patients to go to hospital lost prestige. Prejudice was far more marked in the country than in towns and added to the difficulties already existing, if only by its effect on the morale of the doctor, who might feel dubious about advising treatment which he knew to be right, but which would not satisfy the patient.

Mr. Bulman quoted the following figures supplied to him by three local practitioners.

(*a*) In 32 years' practice, approximately 1400 cases.
Maternal mortality 2, of which 1 case was a placenta prævia "bled white" before sending for doctor; in the other the doctor was called in by a midwife to treat a ruptured uterus. A third case, not counted, died during labour of phthisis.
Puerperal septicæmia, 3.
Cases sent in labour to Norwich, 3.
Abnormalities dealt with included Cæsarean section, 4; decapitation, 1; craniotomy, 3; placenta prævia, 4; accidental hæmorrhage, 1; eclampsia, 4.

(*b*) In 10 years' practice, approximately 250 cases
Maternal mortality, nil.
Cases sent in labour to Norwich, 1.
Abnormalities dealt with included puerperal septicæmia, 1; eclampsia, 1; craniotomy, 1.

(*c*) In 8 years' practice, approximately 600 cases.
Maternal mortality, nil.
Cases sent in labour to Norwich, 1.
This series include 2 cases of puerperal pyrexia and none of puerperal septicæmia.

Mr. Bulman said that (*a*) was a practitioner of the older generation and (*b*) and (*c*) had comparatively recently been translated from hospital conditions. If all practices could show similar results there would be no maternal mortality problem. The suggestions he offered after consultation with colleagues in practice in the country for the improvement of local conditions of childbirth were: (1) increase in the number of district nurses; (2) improved hospital accommodation where practitioners could, if they desire, treat their patients themselves under proper conditions. The provision of a county anæsthetist was advocated by many practitioners, since delay in obtaining a skilled anæsthetist when dealing with abnormal cases was often inevitable. It seemed to Mr. Bulman unlikely that the appointment of a special anæsthetist would overcome this difficulty. A few practitioners expressed satisfaction with present conditions and desired no change. He suspected that some of them feared, probably with justice, an increase in the already overwhelming amount of paper work and form-filling they were expected to do should any further facilities be officially provided. Any proposed maternity scheme should make provision for: (1) propaganda; (2) antenatal clinics; (3) sterile dressings; (4) district nurses; (5) consultants; and (6) coöperation between various workers. Propaganda should be directed not to emphasis on the dangers of maternity, but on the needs of the pregnant and parturient woman, and on the importance of proper supervision of pregnancy, and of proper surroundings for the confinement. Antenatal clinics should be staffed by general practitioners who must be fully conversant with modern antenatal requirements. Sterile dressings should be provided by public health authorities free of cost to necessitous persons. Though they would soon cease to be sterile, they would be far cleaner than the materials at present used as dressings by poor patients, and their use would have a good psychological effect on the patient, nurse, and doctor. All areas should have a district nurse, who should not be allowed to practise midwifery in competition with medical practitioners. The remuneration of both nurse and doctor required revision.

Among the communications to the section of veterinary medicine and agriculture was one on

A Consideration of the Treatment of Tetanus and Post-diphtheritic Paralysis

by Prof. RENÉ CRUCHET (Bordeaux). He described experiments on guinea-pigs which, he claimed, prove the phylactic action of inhalations of chloroform combined with injections of serum in tetanus and post-diphtheritic paralysis. He admitted that the results he had obtained are exactly opposed to those obtained by Debré, Ramon, and Uhry. These authors found that chloroform anæsthesia, combined with the injection of serum (either intravenously or intramuscularly, or subarachnoid injections), given in variable doses a few hours or a few weeks after the paralysing infection, had no preventive or curative action. Prof. Cruchet suggested that the negative results obtained by these workers might be due to the presence of formalin in their toxin. He was convinced from his own experiments, which he described, that in post-diphtheritic paralysis chloroform given before or after the injection of toxin protects the animal and prevents paralysis from occurring, and that chloroform has the same protective power as antidiphtheritic serum, since it is capable by itself of preventing paralysis.

Tuberculosis

Dr. S. VERE PEARSON, speaking of the arrangement of institutions in public tuberculosis schemes, quoted Dr. P. W. Edwards's figures of the after-results of artificial pneumothorax with and without phrenic evulsion. Taking the intermediate stage cases (T.B.+2), of those who had pneumothorax with evulsion, 74 per cent. were alive after a period of three to nine years, of those who had pneumothorax alone 30 per cent. He would like to see specialist chest surgeons added as consultants and the institutions admitting cases of bronchiectasis and other non-tuberculous conditions. For this and other reasons large institutions—up to 300 beds—were preferable to smaller ones.

Dr. D. A. POWELL spoke of the need for careful diagnosis of tuberculosis in children in order to avoid unnecessary stigma. Treatment, he thought, should generally be in a separate block attached to an adult institution, except for the infrequent "phthisical" cases which local authorities should combine to segregate in a sanatorium. Other "thoracic" cases, with negative or no sputum, should be put in a sanatorium school. The "pre-tuberculous" or delicate child, predisposed by family history or environment, was best dealt with in open-air schools.

Dr. R. R. TRAIL considered the danger of isolation of the tuberculosis officer from the sanatorium with its modern methods, a danger made greater when an institution served a big area. Dispensary and sanatorium should, he thought, be regarded as one unit, so that the medical officer did not lose the opportunity of discussing with the patient his after-care. In the past the institution had been the ruling factor, but the lessons taught there were now being taken up everywhere by public health

work. What we did not know in the treatment of tuberculosis was the morbidity of the disease. He would like to see the hospital with a dispensary attached and a week-end rest centre for ex-patients who came back for advice or a week-end's rest. He believed that way they would get a unified system.

Dr. F. W. BURTON FANNING said that the proportion of early cases amongst admissions to sanatoriums varied from 25 to 40 per cent., and asked whether the doctor was to blame for late diagnosis, or the patient for not giving him a chance of making it. An impartial scrutiny of patients' histories made by Dr. W. E. Jolliffe and Dr. D. Wilson at Kelling, suggested delay or mistake on the doctor's part in 25 per cent., culpable delay on the patient's part in seeking advice in 20 per cent., and in 6 per cent. tubercle was discovered unexpectedly in the course of a routine examination for insurance or other purposes. Similar inquiries made in regard to 100 consecutive patients belonging to the more educated and wealthy classes suggested that the doctor had been unduly slow in making the diagnosis in 36 cases, and the patient had unduly delayed consulting him in 20. The balance in favour of the panel over the private doctor might be an example of the advantage of ready access to the tuberculosis officer with his full equipment for X ray and other investigations.

Dr. EVELYN M. HOLMES referred to recent experimental work in Denmark. The Löwenstein-Jensen medium appeared to be extremely selective, enabling particles of sputum to be directly inoculated in the medium without preliminary washing. As a rule, the human type of bacillus gave a free growth after 17–21 days, the bovine type after 28–32 days; the growth obtained being quite different in appearance. Dr. Holmes gave the results of a series of tests, made over a period of months, on all the sputa received by a large laboratory which were T.B.-negative by ordinary staining methods. Over 50 per cent. gave a positive result by culture on this medium. The method had an obvious value in the examination of such things as pleural fluid, cerebro-spinal fluid, or pus obtained from joint abscesses.

MEDICINE AND THE LAW

Oysters and Typhoid Fever

AFTER eating oysters at a St. Leonards hotel a visitor had an attack of typhoid fever which kept him away from his work for five months. He sued the hotel for damages for breach of warranty and negligence; the hotel denied liability and brought in the fishmonger who had supplied the oysters; he in turn brought in the company which sold him the oysters from its oyster-beds. There is nowadays a new procedure for these actions where third and fourth parties are involved. While the first party is attacking the second, the third and fourth are allowed to appear and cross-examine the witnesses but cannot themselves call evidence till the first issue is decided. There is a risk, of course, that the jury may take a view on the first issue which it would have rejected if it had heard the evidence subsequently called on later issues. At present the new third-party procedure is in the experimental stage; this case about the oysters is believed to have been the first of its kind to be dealt with by a jury under the new method.

As a matter of law the hotel proprietors had to admit that, if food was sold there which made the buyer ill, the seller was liable even though every care was taken to secure wholesomeness. There was no doubt the hotel management had been careful, and it was naturally argued that there was no conclusive proof that the typhoid fever was due to the oysters. The jury, however, was satisfied with the evidence given by Lord Horder and others on the plaintiff's behalf and awarded £725 damages. The case then entered the next stage, the hotel proprietors changing from defendants into plaintiffs and suing the fishmonger. He could not deny his legal responsibility in the face of the verdict already given; he therefore submitted to judgment for the sum of £725 in favour of the hotel and forthwith proceeded in turn to sue the company from which he obtained the oysters. He produced some new evidence. There had apparently been other cases of typhoid in Hastings at the material time. One of these patients had eaten oysters before his illness; did not this show that the oyster-beds had somehow become temporarily contaminated? The company which owned the oyster-beds had some fresh evidence too. Several persons at Hastings were called to say that they had had typhoid without oysters, several others to say that they had had oysters without typhoid—oysters, too, from the selfsame barrel as those which the original plaintiff had eaten at the hotel. Bacteriologists produced the records of the oyster-beds and gave them the highest character. Whereas the expert witnesses for the original plaintiff had inclined to suspect oysters as a not uncommon source of typhoid infection, the experts of the final defendants said that nowadays the suspicion was no longer justified. Dr. G. F. Buchan, medical officer of health for Willesden and author of books on typhoid fever, stated that, if there had been contamination of the beds as suggested, he would have expected a widespread outbreak of infectious disease wherever the oysters had been sent. He also thought the period of incubation of typhoid from shell-fish would normally be much shorter than in the original plaintiff's case. It might be only three days; the longer period was consistent with the disease having been contracted after leaving St. Leonards. The judge reminded the jury that no complaint had been made against the cleanliness of the fishmonger's premises or against his handling of the oysters. The jury came to the conclusion that the fishmonger had not satisfied them that he was supplied with contaminated oysters by the company. Thus, pending a possible appeal, the whole liability falls on him; he must pay the first plaintiff the damages of £725, and not only can he not pass on this burden but he must also pay the costs of the hotel proprietors and of the oyster company. Old-fashioned members of the legal profession who have not yet learnt to love the new procedure are asking whether the jury would have found in the first instance that the patient's typhoid was due to the hotel's oysters if it had heard the subsequently given evidence of those oysters' blameless upbringing.

Coroner and Doctor

At the resumed inquest at Leigh on the death of five miners in the Lancashire colliery explosion, a medical witness was questioned by the coroner (Colonel R. M. Barlow) about his action in having taken specimens of blood from four of the bodies without the coroner's permission. He explained that he understood that in any investigation after an explosion it was important for the blood of the men to be examined for carbon monoxide as early as possible; he had therefore taken samples at once. He had, he said, no object except the public good and had acted on request. The coroner, who eventually closed the incident by accepting the apologies of all

concerned, stated that this was the third occasion within a year that there had been interference with a body which was in his custody. There was a question whether it did not amount to contempt of court. According to the authorities a coroner has undoubted powers of punishing contempt by fine or imprisonment, since his court has the dignity of what is called a court of record. There is less certainty as to these powers where the action of which he complains does not take place in the presence of the court. But it is in any case a common-law misdemeanour not only to prevent the holding of an inquest but also to obstruct the coroner in the course of his investigation. To tamper with a body, so that the coroner cannot be sure whether it is or is not in the same condition as when found, is clearly an interference which is technically an offence. It should be possible to arrange with the coroner's permission, or rather, indeed, under his actual direction, for prompt action in taking blood specimens in these cases. He will no doubt be fully aware of the evidential value of the earliest possible examination.

PARIS

(FROM OUR OWN CORRESPONDENT)

NEW CHIEFS FOR THE PASTEUR INSTITUTE

SINCE the almost simultaneous death of Roux and Calmette a few months ago, the choice of their successors has engaged the attention of all concerned and of sundry others. Members of the executive committee have visited the various departments of the institute and have familiarised themselves with their activities. Although many names have been mentioned in connexion with the two vacancies, it is satisfactory that at the decisive meeting on the afternoon of May 17th the appointments were made by a unanimous vote. Louis Martin, the new director, was born in 1864, and is a brother of the present Minister of Finance. Martin's introduction to the Pasteur Institute in Paris dates back to 1892. Since then he has been continuously engaged on important research work, but being in charge of the hospital attached to the institute he has never lost touch with the clinical side of medicine. In 1894 the epoch-making communication on the serum treatment of diphtheria made at Budapest was signed by Louis Martin as well as by Roux. Among the notable contributions to medical science made by the new director are those concerned with experimental tuberculosis and the serum treatment of ictero-hæmorrhagic spirochætosis and trypanosomiasis.

While Louis Martin succeeds Roux, Gaston Ramon becomes sub-director, more or less in the place of Calmette. Ramon was born in 1886, and his name has for many years been associated with the anatoxin treatment of diphtheria. At Garches, only a few miles out of Paris, Ramon has been for several years in charge of that branch of the Pasteur Institute which is concerned with the preparation of diphtheria serum. When the possibility of his being appointed director instead of sub-director was being discussed, only one serious fault was found with him; he was too young. But as this defect will be corrected automatically, it is likely that eventually Ramon will guide the destinies of the Pasteur Institute with that combination of administrative ability and scientific acumen which have distinguished his sojourn at Garches. An innovation is the provision of the Pasteur Institute with a scientific council, whose members include Prof. Jules Bordet, of Belgium, and five other eminent pupils of Pasteur—Gabriel Bertrand, A. Borrel, Mesnil, Nicolle, and Yersin. The term of office of each member of this council is for one year only, but provision is made for re-election as well as for the appointment of new members as needs arise.

A NEW TREATMENT FOR SPRAINS

Four years ago Prof. Leriche, of Lyons, published a paper which set out some unorthodox views on the genesis and treatment of sprained joints which aroused some controversy. Two of his assistants, G. Arnulf and Ph. Frieh, have now [1] brought forward evidence in support of his claims, which are the more interesting in that they promise a shortened period of invalidism. According to Prof. Leriche a sprain is not due to rupture of a ligament. It is suggested that no one has ever seen such a rupture, but that it has been taken for granted; a hypothesis has become an affirmation, and eventually a dogma. In the two cases of sprains of the ankle in which he was able to look and see, Leriche found the external ligaments to be normal, not even infiltrated with blood. He holds that the lesion in a sprain involves the sensitive nerve-endings in a joint. A vasomotor reflex is set up and gives rise to œdema, a local rise of temperature, the familiar functional disturbances, and atrophy of the muscles involved. If, now, the injured parts are promptly infiltrated with novocain, even in the presence of œdema, hyperthermia, pain, and almost complete loss of movement, normal conditions are restored in a few moments; the patient no longer suffers pain, and is able to walk home quite happily. Often, after three or four hours the pain suddenly returns, lasts for an hour or two, and then disappears. On the following day a second injection, and in a few cases a third, may be required. The ailment, thus treated, is said to last a matter of only 48 hours. If Leriche's explanation is correct, the intraligamentary injection of novocain is successful because it breaks a vicious circle by blocking the centripetal impulses travelling to the brain from the injured nerve-endings in the joint. The technique is simple, and the injections can be given even by the practitioner whose knowledge of anatomy has become somewhat rusty. With the exception of the hip, most joints are easily accessible. A few c.cm. of a 0·5 to 1 per cent. solution of novocain are deposited in the periarticular structures, near a tender point if this can be found. With proper aseptic precautions there should be no risk of infection. A few moments after such an injection the patient is told to move his joint, and is generally astonished to find how suddenly and almost completely normal conditions have been restored. This treatment is said to be of value in the differential diagnosis of injuries to the joints, its failure indicating the existence of some gross lesion requiring a radiographic examination and the special treatment resulting from its findings.

IRELAND

(FROM OUR OWN CORRESPONDENT)

PROGRESS IN PUBLIC HEALTH

THE annual report of the Department of Local Government and Public Health for the year ended March 31st, 1933, has recently been issued. County medical officers of health have now been appointed in 18 counties, which include over three-quarters of the entire population. A number of assistant

[1] Presse Méd., April 14th, 1934, p. 597.

medical officers of health and public health nurses on a whole-time basis have also been appointed. School medical inspection has been begun in three additional counties. The number of children examined was 112,776, or about 30 per cent. of the children on the school-rolls. School meals schemes were in operation in 41 districts, and the number of children fed rose from 19,225 to 21,117 in the year. Every area except County Longford had adopted measures for the prevention and treatment of tuberculosis. The death-rate from tuberculosis in 1932 had fallen to 1·24 per 1000 of the population, the lowest on record. The death-rate of children under one year of age had increased, the rates being exceptionally high in urban areas. In Galway the rate was 136 per 1000 births, in Waterford 132, in Sligo 124, in Wexford 113, in Dublin 100. The rate for rural areas was 59 per 1000 births. There was an increased incidence and an increased mortality from diphtheria in both urban and rural areas. In Cork, where a scheme of immunisation has been working for some years, not a single immunised child died. Of the 17 deaths from diphtheria in Cork 10 were of children whose parents had refused to permit immunisation. The number of vaccinations performed showed a substantial decline: the vaccinations represented only 64·4 of the births registered.

Although the report shows some progress in matters of public health the progress is slower than one has a right to expect. The appointment of a county medical officer of health for each county area was made compulsory by law in 1925, but in only two-thirds of the county areas has the law been obeyed. Moreover, it appears from a statement recently made in the Dáil by the Parliamentary Secretary to the Minister of Local Government and Public Health that there has been no addition to the number of county medical officers of health during the past 12 months. Medical inspection of school-children was established by law as long ago as 1919, and it is unsatisfactory that it is as yet only carried out for some 30 per cent. of children on the school-roll.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

AN OPHTHALMOLOGICAL LIBRARY

Dr. Emile de Grosz, well known abroad as president of the International Committee of the Campaign against Trachoma, is celebrating the completion of thirty years' tenure of the chair of ophthalmology in the University of Budapest. His clinic is famous, and in its development he has paid particular attention, among other things, to the development of a worthy library. The money grant made for this purpose by the Government was insufficient to keep abreast of scientific publications, and Grosz had to turn to some other source of support. Eventually this was found in the fees paid by the so-called "extra" patients attending the clinic, and the library proves the success of this plan. It is somewhat pathetic, however, to read the complaints made in his jubilee booklet against the high prices charged for books and periodicals, which make their purchase difficult. He mentions one book—"Kurzes Handbuch"—each volume of which costs 185 marks, while the whole work (seven volumes) cost 1780 pengos. In Hungary this is a very great sum; it is sufficient to buy quite a nice house in one of the suburbs of Budapest. The subscription price of German ophthalmological periodicals varies between 60 and 120 marks.

The clinic can boast having a complete library of antique books on the work of oculists. Most precious among them are Jacob Schalling's "Ophthalmia sive disquitio hermetico-gallenica de natura oculorum," which appeared in German and Latin in 1615 in Erfurt; Georg Bartisch's "Augendienst," published in Dresden in 1583, which, as the first ophthalmological manual, reached three editions; and a very valuable book, Vopiscus Fortunatus Plempius's "Ophthalmographia sive tractatio de oculo," the first edition of which appeared in 1632 at Amsterdam. A curious book is that written by Laurentius Heister, professor of surgery and anatomy at the University of Altdorf, "Apologia .... de cataracta glaucomate ... contra Wolhusii" (1717). This book was written by Heister in defence of his earlier published book against Woolhouse, a contemporary English physician.

DISPUTE BETWEEN THE GOVERNMENT AND BUDAPEST PHYSICIANS

Some months ago the Government informed the National Medical Association that they intended to establish a friendly society for public officials in such a way that medical attendance would be provided on the same basis as under national health insurance. The medical community forthwith revolted against this plan, which would curtail private practice and would mean advantage only to those physicians who got the posts. The association stated that the offer made by the ministry of finance could not be accepted and the latter then said that it was inclined to adopt the free-choice system, allowing public officials to choose their own doctors. The remuneration was fixed as follows: the Government was to pay for each unmarried public official with salary of less than 300 pengos (£17) monthly 12 pengos (14s.) a year, with other payments to correspond. Officials with salaries over 300 pengos monthly were to make their own arrangements with their doctors, the Government paying only the above fees. The National Friendly Society of Public Officials intends to establish also a dispensary employing specialists, who can be consulted by officials only upon the written opinion of the family physician. For each specialist consultation 30 fillers (about 4d.) will be paid by the society. The rumour of these rates of remuneration has caused consternation among doctors, who not only see in this offer the degradation of medical work, but are also clear that it will mean a general reduction of medical salaries which may be fatal to hundreds of practitioners. Hence the Medical Association, representing the whole medical profession of Hungary, has rejected the plan and resolved to boycott the society, if the Government will not raise the fees to a level worthy of the profession.

TRAINING FOR CRIPPLES.—At the annual meeting recently of the Royal National Orthopædic Hospital it was stated that last year out-patient attendances increased from 30,000 to 36,000. There is a prospect of the provision in the near future of a convalescent home of about 44 beds at Stanmore. The annual report emphasised the need of the training school for cripples which the committee hope soon to establish also at Stanmore.—The subject of training was raised also at the annual meeting last week of the Royal Cripples' Hospital, Birmingham. It was then reported that an endeavour was being made to ascertain the number of cripples requiring training, and the attitude of the responsible authorities towards grants for the purpose. The hospital's income of £56,775 left a deficit of £253. The Contributory Association paid £12,554, and a further sum exceeding £14,000 was received in respect of the treatment of contributors and their dependants, which represented 85 per cent. of the cost. The possibility of erecting wards for paying patients is under consideration.

OBITUARY

DAVID OGILVY, M.D., B.Ch. Dub.

MEDICAL SUPERINTENDENT, MENTAL HOSPITAL, L.C.C., EPSOM

As has already been announced, the death occurred on May 13th of Dr. David Ogilvy, superintendent of the London County Council Mental Hospital at Long Grove, Epsom. He had been in bad health for some time, and the death of an efficient and capable officer at the age of 61 is deeply regretted. He was the youngest son of the late Alexander Ogilvy of Dublin, and received his medical education at Trinity College, Dublin, where he graduated as M.D. in 1889, gaining the first place in surgery in the final examination. He also represented his university at Rugby football.

Ogilvy's whole professional career was spent in the study and treatment of mental disease. In the year of his graduation, after a short period as resident at the Criminal Asylum, Dundrum, he came to England and was appointed assistant medical officer at the West Riding Asylum, Wakefield, where he had the advantage of serving under the late Bevan Lewis, whose pioneer work in psychiatry was remarkable. He then joined the L.C.C. service and was appointed an assistant medical officer in the Banstead Asylum under the late Claye Shaw. In 1902 the Horton Asylum was opened, and Ogilvy was appointed second assistant, being soon promoted to be senior medical officer. Here he remained working under the late Colonel J. R. Lord until he was selected in 1912 to succeed Sir Hubert Bond at the Epsom (Long Grove) Mental Hospital, Bond having become a Commissioner in Lunacy.

DAVID OGILVY

We owe to a colleague in the L.C.C. mental service the following appreciation of David Ogilvy. "On appointment to Long Grove, Ogilvy realised fully the distinguished heritage committed to his care, and unsparingly devoted himself to the great work he found there. He took a special interest in the development of occupational therapy on progressive lines, and it was due to his persistent advocacy that a male occupations therapist was appointed for the male division, with such progressively satisfactory results in this form of treatment. He was a man of strong personality, courageous, straightforward, and tenacious of purpose, which was always devoted to the welfare of his hospital. His transparent honesty and sense of justice in connexion with what he conceived as right, was rewarded by the respect and affection of his staff, and from his patients his humanity, kindliness, and devotion to duty secured a ready response. Amongst his medical colleagues he held a special place, and his fearless manner, outspoken speech, and readiness to fight for a good cause endeared him to all who knew him well. One might differ from Ogilvy, but one could not help liking him, and to his more intimate friends he was always affectionately known as 'O.' He was a member of the Royal Medico-Psychological Association, and he took a deep interest in the Mental After-Care Association, on the council of which he served.

"Whether or not Ogilvy was temperamentally an optimist, his attitude towards life was certainly one of determined optimism, not lost in his last illness. He was approaching the natural termination of his service, and a well-earned retirement, into which he would have taken the good wishes of his fellow-workers, had destiny so decreed. He leaves a widow and three children, to whom all who knew him will tender their heartfelt sympathy."

No more conventional portrait of Dr. Ogilvy was available for publication.

RICHARD H. C. GOMPERTZ, M.B., B.S., B.Sc. Lond.

THE death of Dr. Richard Henry Cyril Gompertz, of Barnstaple, has removed from North Devon a practitioner whose public and voluntary work, discharged in addition to the duties of a large practice, benefited the neighbourhood in a noticeable way. Born in 1877, at Madras, the son of an officer in the Indian Army, Gompertz was educated at Bedford Grammar School and King's College, London, and received his medical education at King's College Hospital. Here he was a distinguished student, being both junior and senior Cloth Workers' scholar and Sambrooke scholar. He graduated M.B., B.S. Lond., in 1907, with honours in medicine and surgery, obtaining a gold medal, and later was appointed surgical registrar to the hospital and demonstrator in physiology in the school. At the outbreak of war he served with a temporary commission in the R.A.M.C., and was mentioned in despatches. At the close of hostilities he was for a time medical officer to Berkhamsted School, while at the same time he developed his knowledge of radiology and took part in public duties by coöperation with the St. John Ambulance Association. In 1923 he joined a firm of practitioners in Barnstaple, and in addition to his routine work, was appointed to the charge of the X ray department of the North Devon Infirmary. He continued his close interest in ambulance work, was medical officer to the local Voluntary Aid Detachment, lectured in connexion with the St. John Ambulance Association, and was medical referee under the Workmen's Compensation Act. He was a widely read man, especially in psychology and the later theories of evolution, while he was also a considerable artist and botanist and a prominent lawn tennis player. An all-round and accomplished man, his death at the age of 57 is a loss not only to his circle but to the medical profession.

Dr. Gompertz married in 1920 Marjorie Whitfield, and leaves a widow and two children.

WILLIAM PRINGLE MORGAN, M.B. Dub., D.P.H.

Dr. Morgan, who died at Seaford, Sussex, on March 20th, in his 73rd year, was a practitioner who left a deep impression on those he had served and in whose activities he had shared. He was born at Rostrevor, Northern Ireland, the son of the Rev. Thomas Morgan, educated at Dundalk Grammar School, and Trinity College, Dublin, where he graduated in 1885. In the following year he settled at Seaford, and shortly after took his D.P.H. In 1889 he married Miss Ethel Eastwood of that town—or village as it was then—and for 45 years he watched

its growth and consolidation. In due time he became chairman of the urban district council, being elected in two succeeding years. In masonic circles he was well known, being master of the Seaford lodge and in 1911 provincial junior grand deacon. Although over age he served in the war at Malta and Salonica. He was a member of the Sussex Archæological Society and of the Society of Sussex Downsmen; and was chairman of the local branch of the League of Nations Union. He took an active part in the work of the B.M.A., and in 1925 was president of the Sussex branch. A colleague writes:—

"Morgan believed intensely in Voltaire's principle 'il faut cultiver notre jardin'; but for him, highly endowed though he was, it was not just a matter of watering, but of sowing and then watering. He did not expect himself, or anyone, just to sit with their inherent gifts. To the end he retained a fascinating and informing interest in his work, in his pursuits, in literature, in music. His leisure was always utilised; he never lounged in thought or action. He hated slovenliness of speech or talk, and his own finely spoken words and ringing enthusiasm will go on echoing through many people's lives. Such a man cannot be easily forgotten."

Mrs. Morgan survives him, together with two daughters and two sons, of whom the elder is ophthalmic surgeon to Guy's Hospital.

WILLIAM BROGDON PATERSON, M.B. Edin.

THE death of Dr. W. B. Paterson, at his home at Aigburth, on May 11th, removes a practitioner who was widely known and respected in Liverpool. He was born in 1865, his father being minister of Tranent, East Lothian. He was schooled in medicine at Edinburgh, where he qualified M.B., C.M. in 1887, afterwards becoming resident physician at the Cowgate Dispensary. He went to Liverpool as house surgeon to the Royal Southern Hospital, was for some time medical officer to the Liverpool Medical Mission, and then became a partner of the late Dr. John Grimes, of Grassendale, with whom he remained until 1903. Until a few years ago he was associated in partnership with Dr. H. R. Hurter, of Cressington. His colleagues honoured him at various times by electing him first librarian and later vice-president of the Liverpool Medical Institution.

Dr. Robert Coope writes: "Paterson's stocky figure, with bright and kindly eyes shining from behind rather shaggy eyebrows, became well known to the men and women of all walks of life who made up the field of his large and widely extended family practice. His skill as a practitioner kept pace with the rapid advances of medicine, and to his professional duties he brought a discipline and integrity of purpose which left him with neither time nor inclination to waste words or energy on small talk or trivialities. At times life had hit him hard, but he emerged out of disappointment and sorrow to a fine sensitivity and sympathy, which was all the stronger for his reticence.

"His love of the beautiful in life brought him delight in art, in the engaging loveliness of children, and most of all in the contacts of his daily work. He possessed that austere sense of fitness and restraint which is associated with the classical Greek spirit, but with it were fused a serene kindness and an unusual power of feeling. A man's relations with children are a revealing touchstone of his quality; I had the intimate privilege of seeing how, busy as he was, he treated children with winning dignity and seriousness, so that they loved him and regretted that he could not stay longer on his visits. I learned, too, his power not only of saying the right thing but of giving that rare sympathy which has an astringent and strengthening quality in it."

FRANCIS SEYMOUR KIDD

A COLLEAGUE of Mr. Frank Kidd writes: "May I add a few words to the obituary notice published in THE LANCET on May 19th? In 1913 Frank Kidd started the genito-urinary department at the London Hospital, which from small beginnings has become one of the largest special departments, and soon established his reputation as one of the leading urologists in England; his enthusiasm for this branch of surgery was originally stimulated by his old chief, Mr. Hurry Fenwick. As Kidd's reputation increased so did his private practice, and by the end of 1920 he found that his health was unable to stand the strain of both his large practice and his arduous work at the London; so on medical advice, and greatly to his own sorrow, he resigned from the London and did no more hospital work except in the capacity of consulting surgeon to St. Paul's Hospital. But although he had left the hospital he loved, he never allowed his enthusiasm for urology to wane, and in 1920 was a member of the organising committee that founded the urological section of the Royal Society of Medicine. He acted as honorary secretary of the section from 1921 to 1923, and in 1927 was president. He read many papers at the section and contributed frequently from his extensive experience to the discussions. In 1928, in collaboration with Mr. Winsbury-White, he worked hard in starting the *British Journal of Urology*. The first number was published in March, 1929, and Kidd's enthusiasm enabled him to acquire an editorial committee drawn from the best-known British urologists, while he himself became editor, with the assistance of Winsbury-White, who later carried on alone when Kidd's health broke down. From the start the publication was a success, and it is a general hope that it will remain as a lasting memorial to its founder. Through text-books and papers on urological subjects, Kidd's name was well known throughout Europe and America; he was twice invited to address the American urologists in conclave, going to the United States for the purpose, while he acted as secretary to the British section of the International Association of Urology.

"As well as having such an extensive knowledge of his subject, Kidd was a very skilful operator, and nothing was too much trouble where his patients were concerned. Into those of us who had the pleasure and privilege of working with him, he was able to instil his own enthusiasm; he was our loyal colleague and a generous friend to those who worked with him. Unfortunately his physique was not in keeping with his restless energy; he found it very difficult to relax, so that the strain told more and more on his health, and in November, 1932, following a motor accident, his health broke down and he had to retire from practice."

ENLARGEMENT OF SALISBURY INFIRMARY.—It has been decided to enlarge this hospital from 171 to 226 beds at a cost of £85,000, to be provided by public subscription. There will, in addition, be a paying ward of 15 beds. The enlargement is intended mainly to provide for specialist needs. A proposal to build an entirely new hospital at a cost of £900 per bed was rejected. Last year 2429 in-patients were admitted, who stayed on an average 19·7 days.

CORRESPONDENCE

SANITY IN A MENTAL WARD

To the Editor of THE LANCET

SIR,—The letter of Dr. Edwin Goodall in your issue of May 19th—so convincingly sound—will I am sure be welcome to all those practising and interested in psychiatric medicine. As he truly states: "This provision, regarded as elementary, and long since made on the continent, has been urged for this country to my personal knowledge for 40 years—and probably longer." But the opening of Shenley Mental Hospital by the King and Queen on May 31st may create a revolution as unique as any "opening" in the hospital world of medicine. Is it not another royal example of profound interest in British medicine? If it should lead constructively to a further type of general hospital similar to that at the Johns Hopkins Hospital, Baltimore, we shall be advancing in preventive medicine. With mental cripples on one side and physical cripples on the other, what can be more ideal?

I am, Sir, yours faithfully,

Ryhope, May 21st. JOHN FREDERICK BRISCOE.

PANCREATIC INSUFFICIENCY IN GRAVES'S DISEASE

To the Editor of THE LANCET

SIR,—Encouraged by the favourable criticism of some of my colleagues I am bringing to your notice a method of treating exophthalmic goitre by the oral administration of an extract of the pancreas. Since 1931 I have treated with uniform success a series of ten patients of ages ranging from 23 to 57. The conditions of my work do not allow me to present records with detailed metabolic investigations, but I have good reason to be satisfied of the value of the remedy, and would be therefore glad of the coöperation of those with facilities for examination and continuous treatment on a larger scale.

Authorities on Graves's disease may admit an associated lesion of the thymus gland, suprarenal cortex, liver or other lymphoid tissue; but the pancreas is not singled out as showing pathological changes. Yet outside the usual Graves's syndrome we get such symptoms as diarrhœa, glycosuria, and increased appetite, indicating that the pancreas is possibly involved. It seems to be firmly established that there is deficiency of iodine in the thyroid gland in Graves's disease, and Marine holds that the gland enlargement represents a compensatory hyperplasia. The deficiency may, he suggests, arise either because there is a diminished amount of iodine in the diet, or because the body for some reason requires an increased supply, or because there is something which blocks tissue oxidation. May not this block be in the pancreas, impairment of whose function leads to imperfect absorption of fats and proteins? In practice I have found that pancreatic extract will sometimes control diarrhœa of long standing, and in a very severe case of Graves's disease of 18 years' duration I gave the extract to combat typical pancreatic stools. The diarrhœa cleared up in a day or two and to my astonishment the large goitre disappeared within a fortnight, and the patient's general condition improved out of all knowledge. This encouraged me to try the extract in the case of a woman who had been treated for some time with Lugol's iodine. She had all the symptoms of Graves's disease, well marked, with occasional loose stools; but after six months' treatment there was no longer any evidence of thyrotoxicosis. I shall not here give details of the others treated, but it is interesting to note that out of ten the only case which has not completely reacted to the treatment is one in which pancreatic disease is well established; and even here the cure is almost complete.

As a rule it takes from six months to a year for the usual symptoms to disappear, but the patients carry on meantime with their ordinary duties. The blood pressure and basal metabolic rate show improvement fairly quickly and the patients soon notice an amelioration of their symptoms. In some cases I have given the extract alone; in others I have combined Lugol's iodine with it. The preparation used is Oppenheimer's palatinoids Pancreatin grs. 5, given thrice daily immediately before meals.

Prof. C. Harington in his book the "Thyroid Gland," in discussing the possibility of lesions of the pituitary gland and suprarenal cortex in thyrotoxicosis, sums up thus:—

"Neither of these hypotheses can be advanced as a serious theory of the ætiology of Graves's disease. They are discussed here because it seems to the writer that it is almost certainly on some such lines that the explanation of the problem of Graves's disease will eventually come. The only practical means at present of handling the condition consists of a palliative surgical measure devoid of any rational basis."

Does not insufficiency of the pancreas fill the gap to which Prof. Harington refers?

I am, Sir, yours faithfully,

Liverpool, May 16th. C. BAIRD MACDONALD.

UNFORTUNATE PUBLICITY

To the Editor of THE LANCET

SIR,—I write to disclaim all responsibility for the publicity given to my name in a professional capacity in the lay press. Recently my name appeared in a newspaper article in which the following statement was made: "At first-hand from the doctors and their patients themselves, I have learned how all these astonishing operations are being performed." I have never discussed my professional work with representatives of the lay press, and have never conveyed information to them directly nor by any indirect channels. Requests for interviews have been consistently refused.

I am, Sir, yours faithfully,

J. W. TUDOR THOMAS.

Clifton Lodge, Cardiff, May 20th.

MEASLES SERUM IN A CASE OF ULCERATIVE COLITIS

To the Editor of THE LANCET

SIR,—The following case is, I think, of sufficient interest and importance to justify its being reported. An otherwise healthy young girl, aged 21, was recently under my care suffering from her third attack (within three years) of ulcerative colitis, which had been going on uninterruptedly for just over three months. Her previous attacks were less severe and lasted approximately one month and two months respectively.

On expectant treatment she was doing badly, passing blood and mucus about six times a day, and an ileostomy was contemplated. As her brother, who had been in contact with her, developed a typical attack of measles, it was deemed advisable to immunise her, as she had not previously had this disease. She was accordingly given 12 c.cm. of convalescent measles serum intramuscularly into the

thigh. Within 48 hours there was marked improvement in her condition, both local and general, and within a week the blood and mucus, which had by this time increased sufficiently to cause some concern, entirely disappeared and her motions became perfectly normal.

I have heard of other cases of ulcerative colitis that have cleared up equally dramatically after a blood transfusion. I would, therefore, ask those who have an opportunity of seeing and treating a number of cases of this very distressing, though fortunately rare, disease, to try this method of treatment and publish their results. My feeling is that ordinary human serum would act as well as convalescent serum.

I am, Sir, yours faithfully,

L. CARLYLE LYON, M.B.

Creffield-road, Ealing, May 14th.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Whitsuntide Adjournment

ON May 17th the House of Lords adjourned for the Whitsuntide recess until May 30th. The Royal Assent was given to a number of Acts, including the Births, Deaths and Marriages (Scotland) (Amendment) Act, and the Water Supplies (Exceptional Shortage Orders) Act.

In the House of Commons on May 18th the Birmingham United Hospital Bill was read the third time. The House adjourned for the Whitsuntide recess until May 29th.

Psycho-physical Tests for Drivers

When the Road Traffic Bill was considered by a Standing Committee of the House of Commons on May 17th, on Clause 5 (Tests of competence to drive of new applicants for licenses and of offenders ordered to be tested), Sir ERNEST GRAHAM-LITTLE moved an amendment providing that applicants should be required to pass a prescribed psycho-physical examination for fitness and subsequently the prescribed test of competence to drive. Tests had been worked out by the Institute of Industrial Psychology in many other walks of life, and the experience which had been gained by expert observers in studying the causes of accidents in factories was a very material argument for the consideration at any rate of the subject in the case of motor accidents.

There were 106,000 factory accidents in one year, of which 66,000 were considered by experts observing them to be due not to carelessness or the act of God, or anything else fanciful, but to real conditions in the personnel of the factory. In the case of the breakage of crockery in restaurants when the employer tried to meet it by punishment for carelessness, fines, and so on, the progress made was negligible, but when experts studied the matter a very different state of affairs was revealed. When psycho-physical tests were instituted in these cases a very remarkable result followed, and breakages were greatly reduced. They were very commonsense tests. Fatigue, rush hours, bad ventilation, poor lighting, and emotional states all entered into the production of accidents. The practical utility of the tests was immediately demonstrated, and it was instructive to note that in a report by the Chief Inspector of Factories in 1932 he stated that it was of very little utility to go on trying to meet factory accidents by improvements in machinery. They had practically exhausted the usefulness of that line of research. When they began to treat the human factor progress had been enormously greater and it was the human factor that he proposed they should consider in this amendment.

HUMAN FACTOR IN ACCIDENTS

What was the estimated ratio of the human factor in the production of accidents upon the roads? That was very difficult to estimate, because unfortunately the evidence had been derived from unin-structed sources. Policemen and coroners had been the principal witnesses, and chief reliance had been placed on their statements as to the causation of accidents. But where expert investigation had been made it had been conclusively shown that it was the same cause in road accidents as had operated in factory accidents. The human factor was by far the more important of the two producing that result. He (Sir E. Graham-Little) had been in close touch with the Institute throughout. The director had himself given here a proposed category of tests, and it was that combination which he suggested might be considered as being a practical application of this amendment.

The tests were divided into three classes. The first was the investigation of factors determining the capacity of response to an emergency. Under that heading three inquiries were made. The first quality that was tested in that way was the simple reaction time. The test was made by the person tested pressing upon certain levers when certain lights came into view, and the test was the simple reaction time undisturbed by any other factors. A very remarkable fact that emerged was that response was very different in different persons. It might vary from half a second to a second and a half—a difference of 150 per cent. The next test was the reaction time confronted with distraction, and a very ingenious method had been devised. A film was exhibited and the observer was required to press the levers while looking at the film. In the case of an interesting film the reaction time was very materially increased. The third test was that of vigilance. That was made by putting on a film and cross-examining the tested person. He must remember something about the film as well as press the levers when the lights went up. That was again a more prolonged reaction time. Under the second heading were tests for ability to make rapid and accurate judgment of the size of objects, the space between objects, distances and speeds—a very simple apparatus and an extraordinarily efficient one. The third category was tests of vision both with regard to acuteness of vision and the condition of the eye muscles—a highly important factor in estimating distances. He did not suggest that they should include a medical test. It would be much too expensive, and experience had shown that gross disabilities, as, for example, hearing, came out in the application of the physical tests. They could tell at once if a man could not hear when one was talking, and attention might be directed in that way to the importance of a professional examination of the candidate.

THEORY AND PRACTICE

The scientific accuracy of the investigations might be estimated in this way. The correlation between the scores made at the Institute and the accident records of persons tested in a large number of cases had been singularly close. There was no doubt that from the scientific point of view the tests were absolutely to be relied upon. He would emphasise the importance of the reaction time by one statement.

It had been said that one could stop in the distance of one's car own, which was demonstrably impossible. There was a formula for estimating braking distance which had been mathematically worked out and was accepted by motorists' associations, and to the braking distance they must always add a figure which varied with the reaction time, and on the average, as a rough estimate, it might be taken that if one wanted to get the stopping distance they must add to the braking distance a figure in relation to the velocity of the car in miles. If one was going 30 miles an hour one must add a distance of 30 feet. That was a very material accentuation of the problem of stopping, and he thought it was often entirely ignored by motorists.

APPLICATION OF THE TESTS

The actual application of these tests had been made on quite a large scale, not unfortunately in this country, although the greater part of the work had been done in this country. It had been applied far more extensively in other countries, notably in France, the United States, and Germany. Some figures had been given of experience in Paris.

In one comparison of a certain number of private cars, lorries, and practically all vehicles not omnibuses or trams the accidents in ten years were investigated, and it was found that the accident rate increased in that period by

145 per cent. In a corresponding group, taking figures from the General Transport Company of Paris which was responsible for trams and omnibuses, similar tests had been applied, and in that group there was a decrease of 30 per cent., and the company found they were saving something like 1,500,000 francs a year by the operation of the test in the improved wear and tear of their vehicles.

It might be objected that the number of instances was too small to be of any scientific value. That objection had been met by asking a very noted professor of statistics in the University of London to consider the matter from his point of view, and he had given it as his opinion that the number of accidents was quite sufficient to indicate the trend.

TESTING BEFORE GOING ON THE ROAD

Sir E. Graham-Little said he had the authority of the Institute to make the statements which he had made. It was suggested that they should restrict the tests to the three categories named, though at the Institute they did a much wider series of tests. It would be better to restrict the tests in that way and not to apply what they applied now, and that was a test for road behaviour. He did not propose that the road test should be applied by the expert in this matter, but that the present road test should be combined with the tests he had described. He was assured by competent authority that the technique of application could be learned in something like a fortnight by any person of average intelligence and with some driving experience.

Mr. STANLEY, Minister of Transport: How can they get driving experience if they are not allowed to go on the road until they have had this test?

Sir E. GRAHAM-LITTLE said that the tests could be carried out by persons who were already drivers. It would not necessarily mean the employment of a large body of experts like medical practitioners: that was not intended at all. The number of persons who could be examined had been carefully gone into and it had been estimated that six or even more persons could be taken at one time by one instructor, and the duration of the tests in those circumstances could be reduced to 30 minutes. The cost to the individual candidate would be relatively small. The outside cost, it was suggested to him, for the full apparatus to carry out the battery of tests would be in the neighbourhood of £60. He did not think that there ought to be much difficulty in providing centres for tests on a very large scale. He strongly urged that the tests he had suggested should come before the road test because one of the most important features of this proposal was that the faulty driver was very quickly identified. Again, the tests would reveal any gross medical disability, and then proper treatment could be given. Medical and other experience suggested very strongly that the application of such tests might possibly make an enormous difference in the toll of the road.

CRITICISM OF THE TEST

Sir J. LAMB said he hoped the Minister would not accept the amendment. It would be a serious error to put any specific tests in an Act of Parliament. The proper course would be to leave it to the Minister to issue regulations as to these tests.

Mr. LOVAT FRASER supported the amendment.

Mr. LLEWELLYN-JONES suggested that an experiment of this kind might be made with drivers of public service vehicles. In this way information could be gathered to show whether or not the tests should be applied generally.

Sir FRANCIS FREMANTLE endorsed Sir J. Lamb's view that this was rather a question for the regulations to be issued by the Minister, but he asked the Minister to take into account the substance of this amendment. Instead of dealing only with the more obvious and easy matters in his regulations he should take into consideration the reaction factor. He did not believe that it was possible to apply the tests in the way suggested by the amendment, but he thought they might be worked into the regulations

THE MINISTER'S REPLY

Mr. STANLEY said he was not in the least detracting from the value of the experiments which had been carried out, or the possibilities of much greater advances in the future, when he said emphatically that this amendment could not possibly be accepted. The result of it would be that without an appeal against what was admittedly an experimental system a man could be kept off the roads for ever. He (Mr. Stanley) had had the advantage of a long conversation with the director of the Institute referred to by Sir E. Graham-Little, and he certainly did not gather that the director regarded the tests as a practical possibility at the present time. The experiments had shown quite clearly the possibility of grading drivers, of finding out which were the better drivers and which were the less good, but there was nothing in the evidence which would enable them to determine whether by the application of these tests they could find out for certain before a man had been in a car whether or not he would be a safe driver. He would watch the future of these experiments with interest, but at the present moment he was convinced that to attempt to place upon this experiment such a heavy burden as this would only be to crush it in its infancy and bring the whole idea into ridicule and disrepute with the public, and to stop what might in the future become a very valuable development.

The amendment was negatived.

HOUSE OF COMMONS

WEDNESDAY, MAY 16TH

Overcrowding in Women's Prison in Palestine

Sir GEORGE GILLETT asked the Secretary of State for the Colonies whether his attention had been called to the overcrowded condition and the lack of suitable accommodation in the women's prison at Bethlehem, in Palestine, so that there were cases of women suffering from insanity living alongside the other prisoners, whom they disturbed night and day with their cries; and whether he would take steps to remedy this.—Sir PHILIP CUNLIFFE-LISTER replied: I have no detailed information regarding the conditions that exist in this prison. I will bring the question to the notice of the Government of Palestine: but as they have made provision in the Estimates for the current year for additional accommodation for female prisoners, I have no doubt that they are taking steps to the end suggested by my hon. friend.

Shell-fish Contamination and Typhoid Fever

Sir MURRAY SUETER asked the Minister of Health whether his attention had been drawn to a recent case before the King's Bench Division, in which evidence was given that typhoid fever had been contracted as a result of eating oysters; and if he would cause an inquiry to be made as to why the precautions taken under regulations of public authorities to prevent contamination in shell-fish were ineffective in the case referred to.—Sir HILTON YOUNG replied: My attention has been drawn to the case referred to by my hon. friend but, as he is no doubt aware, it was subsequently decided that the oysters as supplied by the fishing company were not shown to be contaminated. I am, however, communicating with the local authority concerned in the matter.

Houses Built by Private Enterprise

Mr. HOLDSWORTH asked the Minister of Health how many houses built by private enterprise without subsidy during the six months ended 31st March, 1934, were built to let at weekly rentals of less than 8*s*. and 10*s*., exclusive of rates.—Sir HILTON YOUNG replied: Of the 120,781 houses provided by private enterprise without State assistance during the half-year referred to, 44,754 were of a rateable value not exceeding £13 (£20 in Greater London) and 22,730 were occupied by persons other than their owners. The statistics available do not include a classification of the houses last mentioned according to the rents charged.

Building Societies and Housing Loans

Mr. MITCHESON asked the Minister of Health if he could furnish an estimate of the sum advanced by building societies in the year ended March 31st, 1934, to facilitate building operations under the provisions of the Housing Acts.—Sir HILTON YOUNG replied: I have no information except in so far as advances are made in respect of houses erected with the help of guarantees given in pursuance of section 2 of the Housing Act, 1933. For this limited purpose the advances made by Building Societies up to March 31st, 1934, amounted to £442,360.

The Cleansing of Oysters

Sir JOHN PYBUS asked the Minister of Agriculture whether he had received a report of the inauguration of the cleansing of oysters at Brightlingsea according to the method devised by his department by means of an installation provided by the Brightlingsea urban district council with their advice and approval; whether he was satisfied with the result; and whether he would take steps to secure the provision of similar installations in connection with other oyster fisheries.—Mr. ELLIOT replied: I have learned with satisfaction that the cleansing of oysters at Brightlingsea has been successfully initiated and is proceeding with excellent results. The technical officers of my Department will always be ready to advise and assist local authorities who may be disposed to follow the valuable lead given by the Brightlingsea urban district council.

FRIDAY, MAY 18TH

Invalided Naval Officers

Sir ROBERT GOWER asked the First Lord of the Admiralty how many naval officers were invalided during the years 1932 and 1933, respectively; how many there were whose invaliding disability was considered to be attributable to service; and how many whose invaliding disability was not considered to be attributable to service.—Sir BOLTON EYRES-MONSELL replied: The numbers of naval and Marine officers invalided during the years 1932 and 1933 were 36 and 22 respectively. The numbers whose invaliding disabilities were considered to be attributable to the Service were 10 in 1932 and 7 in 1933. The disabilities of the other officers who were invalided were not considered to be attributable to the Service.

Voluntary Hospital Finance

Sir ROBERT GOWER asked the Minister of Health whether he had given further consideration to the Report of the Voluntary Hospitals Commission; whether he proposed to provide public funds for hospital extension on the lines recommended; and whether he had any statement to make.—Sir HILTON YOUNG replied: I am aware of the recommendation made by the Voluntary Hospitals Commission in their report of 1925, but I would remind my hon. friend that the situation has been materially altered since that date by the passing of the Local Government Act, 1929, which confers wide powers upon county councils and county borough councils in relation to the provision of hospital accommodation, including the power to make subscriptions or donations to voluntary hospitals. In view of these powers it is clearly undesirable to provide assistance in the form of direct Exchequer grant.

GUY'S HOSPITAL.—The radiographic departments of this hospital have recently been re-equipped by a gift of £6000 from the Albert Levy benevolent fund through Sir Albert Levy, who is a governor of the hospital. The fund was created in 1929, and in addition to the annual distribution of income the trustees must distribute the whole capital in 25 yearly instalments. The total amount received and distributed during the operations of the period will be more than £400,000.

In 1933 14,608 patients were radiographed in the department. The cases included 4631 fractures, 2337 test meals, and the examination of 3409 chests. A total of 23,377 photographic films were taken, and 5361 screen examinations were made. The cost of the films was £2960.

THE SERVICES

IMPROVED CONDITIONS FOR THE NAVAL MEDICAL SERVICE

THE Admiralty has published a Fleet Order stating generally the new rates of pay and conditions of retirement in the Naval Medical Department. As the regulations are not very precise and detailed it cannot be reckoned what are exactly the improvements, but there seems to be an advance in pay all round. Senior surgeon commanders need no longer retire at 50, as they were obliged to do after the war, and they get increased pay and improved prospects of promotion. Surgeon captains are to be 33 instead of 20. If these regulations remain in force there will be a greater advantage than formerly in joining the Department.

ROYAL NAVAL VOLUNTEER RESERVE

The following appointments are notified:—

Surg. Comdr. S. W. Davidson to *Tiverton*.

Surg. Lt. Comdr. G. McCoull to *Tiverton*.

Surg. Lt. Comdrs. (D.) F. D. Manners to *Pembroke* for R.N.B. and A. C. Bloomer to *Pembroke* for R.N. Hospital, Chatham.

Surg. Lts. R. H. Longmoor to *Valiant* and A. P. Gorham to *Tiverton*.

ARMY MEDICAL SERVICES

The undermentioned Lt.-Cols. from R.A.M.C. to be Cols.: W. Mitchell, E. Gibbon, and Bt.-Col. R. W. D. Leslie.

ROYAL ARMY MEDICAL CORPS

Maj. G. A. Blake to be Lt.-Col.

Capt. P. V. MacGarry retires receiving a gratuity.

Lt. J. C. Reed to be Capt.

RESERVE OF OFFICERS

Maj. D. S. B. Thomson, having attained the age limit, ceases to belong to the Res. of Off.

ARMY DENTAL CORPS

Capt. S. H. Bannerman to be Maj.

Lt. W. E. Duckworth to be Capt.

TERRITORIAL ARMY

Lts. P. Weiner, A. R. C. Higham, E. Hutcheon, R. F. Phillips, J. K. Steel, and J. B. S. Guy to be Capts.

Lt.-Col. A. F. Lee resigns his commn. and retains his rank, with permission to wear the prescribed uniform.

H. Sissons (late Offr. Cadet, Manchester Univ. Contgt., Sen. Div., O.T.C.) and W. G. Bisset (late Cadet, Glenalmond Coll. Contgt., Jun. Div., O.T.C.) to be Lts.

Supernumerary for service with the O.T.C.—C. L. Heanley (late Cadet, Cambridge Univ. Contgt., Sen. Div., O.T.C.) to be Lt. for duty with the Med. Unit, London Univ. Contgt., Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS

Maj. C. W. F. Greenhill, from Active List, to be Maj.

Lt. W. E. Tucker, from Active List, to be Lt.

ROYAL AIR FORCE

Flight Lt. (Hon. Squadron Leader) J. W. H. Steil relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Leader.

HONORARY PHYSICIANS TO THE KING

Lt.-Col. R. C. Priest, R.A.M.C., and Col. D. P. Goil, I.M.S., have been appointed Honorary Physicians to the King. Lt.-Col. Priest is promoted to the rank of Bt.-Col. in succession to Maj.-Gen. H. C. R. Hime, retd. The appointment of Col. Goil is in succession to Maj.-Gen. Sir John W. D. Megaw, retd.

PANEL AND CONTRACT PRACTICE

Vexed Points in Certification

THE note under this heading in our issue of April 28th (p. 919) has led to rejoinder based, we think, partly on misunderstanding. For instance, Dr. X. writes: "Your notes on giving certificates to pregnant women show that the approved societies have again attempted to increase the clerical work of panel practitioners, but with all their ingenuity the societies have not evolved a formula which will enable me to state the reason why I consider a case, such as a pregnant land worker, unfit for work. English medicine is still an affair between doctor and patient which is conducted viva voce. Few patients ever read their medical cards; fewer still their certificates. If one simply wrote instructions on the certificate and then asked the patient why they were not followed, the answer would be that the doctor did not tell the patient. To write these instructions is simply to inform the society what they are, nothing more." In making his point Dr. X. is not quite fair to the approved societies, for the suggested rules were arrived at by a meeting between representatives of approved societies and members of the Insurance Acts Committee, and were only simply a consensus of opinion. They have not yet even been considered by the Ministry of Health. Nevertheless one can hardly imagine a doctor writing instructions on a certificate to come again on a particular day without at the same time instructing the patient by word of mouth to do so. And it may well be asked: How can a society find out how verbal instructions to attend are obeyed unless they are confirmed in writing on the certificate?

Commenting on the statement of approved society representatives that it is rare to find filled in on the certificate the date on which the patient is to see his doctor again, Dr. X. remarks: "It is simply untrue to say that 'patients are apt to attend weekly'; they attend when they are told to do so, and the most practical method of securing this is to limit the amount of medicine they receive to what they can consume in the interim. If they then fail to attend, a question as to how they expect to get well without medicine will do more to secure attendance than any effort the society can make. Most patients are grateful to find they are not obliged to make attendances specially for certificates. The system of attendance on the same day of the week finds favour with some agents who like paying definite weekly sums instead of working out the sums in sixths and paying the number of sixths to which a man is entitled. The much abused English monetary system is peculiarly adaptable to the division of small sums into sixths. It would be well for societies to scrutinise their agents' reports to discover which are paying the bulk of the claims in weekly sums and which in four-sixths, seven-sixths, and so on. Such a list would inform them which agents are doing their work and which, by avoiding a little extra trouble, are increasing work for doctors and attendances for patients." But Dr. X. seems to overlook that on the question of payment for parts of a week in sixths agents are bound by the rules of their societies; Some allow payment up to the date of certificate, others only to the weekly pay-day; others, again, pay up to the date of the weekly pay-day provided a certificate has been given during that week—thus often paying a day or so beyond the date of the certificate.

Dr. Y. raises the question of breach of confidence on the part of the doctor who certifies pregnancy. "Many women," he writes, "are content to allow their agents to remain in ignorance of what their doctors know. It is perhaps too much to contend that to inform the official of a London society who does not know the woman that she is seven months pregnant is a breach of professional confidence, but the certificate may be seen by the local agent. If she runs me in for allowing her agent to know when to expect the confinement, will the fact that I cannot obtain sick pay for her without running the risk of doing this be an adequate defence?" The answer, of course, is that there is no breach of confidence in writing anything upon a certificate, marked confidential, given to the patient by the doctor. It is the patient who hands it or sends it to the head office or to the local agent; it is therefore the patient, not the doctor, who is responsible for the publicity of its contents. There is, however, a provision in the certification rules whereby a doctor may give an indefinite diagnosis on a certificate for the patient to hand to the society; but if he does so he must at the same time inform the regional medical officer of the precise diagnosis, and let the society know that the certificate is not as precise as it might have been. The form provided for this purpose is Med. 40 D. It might be used where pregnancy occurred in a single girl or in the case of venereal disease where loss of employment or other damage would result if the precise diagnosis were to become known locally. It could hardly be used to hide the probable date of confinement in a known case of pregnancy.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 12TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (last week 2); scarlet fever, 2658; diphtheria, 1163; enteric fever, 25; acute pneumonia (primary or influenzal), 1060; puerperal fever, 57; puerperal pyrexia, 110; cerebro-spinal fever, 22; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 7; dysentery, 4; ophthalmia neonatorum, 90. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 21st–22nd was as follows: Small-pox, 14 under treatment, 6 under observation (last week 9 and 3 respectively); scarlet fever, 1594; diphtheria, 1669; measles, 2493 (last week 2740); whooping cough, 304; puerperal fever, 32 mothers (plus 11 babies); encephalitis lethargica, 259; poliomyelitis, 3; "other diseases," 125. At St. Margaret's Hospital there were 12 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox or enteric fever, 78 (30) from measles, 10 (2) from scarlet fever, 35 (4) from whooping-cough, 42 (12) from diphtheria, 45 (16) from diarrhœa and enteritis under two years, and 48 (5) from influenza. The figures in parentheses are those for London itself.

Deaths from measles and whooping-cough are steadily on the decline, but 11 fatal cases of measles were reported from Liverpool, 7 from Newcastle-on-Tyne, and 4 from Barnsley, while Liverpool also reported 8 fatal cases of whooping-cough, Birmingham 5. Diphtheria proved fatal in 3 cases at Ilford and 3 at Birmingham.

The number of stillbirths notified during the week was 298 (corresponding to a rate of 44 per 1000 total births), including 47 in London.

MEDICAL NEWS

University of Oxford

Dr. C. F. T. East and Dr. C. P. Symonds have been nominated by the general medical electorate to the board of the faculty of medicine.

Dr. John Carew Eccles, Staines medical fellow of Exeter College, has been elected to an official fellowship and tutorship of Magdalen College.

University of London

At a meeting of the senate on May 16th the title of university reader in bacteriology was conferred on Dr. L. P. Garrod, bacteriologist and lecturer in bacteriology to St. Bartholomew's Hospital medical college. Dr. G. R. Cameron, since 1933 pathologist to the Queen Mary's Hospital, Stratford, was appointed university reader in morbid anatomy at University College Hospital medical school.

The degree of D.Sc. in physiology was conferred on Dame Louise McIlroy, university professor of obstetrics and gynæcology at the London School of Medicine for Women.

Royal College of Physicians of Edinburgh

The Kirk Duncanson fellowship for medical research will shortly be awarded. Particulars will be found in our advertisement columns.

Royal College of Surgeons of Edinburgh

At a meeting of the College held on May 16th, with Dr. A. H. H. Sinclair, the president, in the chair, the following candidates having passed the requisite examinations were admitted Fellows:—

Paul Joseph Fogarty, M.B. N.Z.; Samuel John Campbell, M.B. Belf.; Samuel Davidson, M.B. Edin.; David John Davies, M.B. Lond.; Morgan David Arwyn Evans, M.D. Wales; John Malcolm Fosbrooke, M.B. Edin.; Kennedy Hunter, M.B. Belf.; Morris Louis Kaufman, M.B. Liverp.; David Henry Klugman, M.R.C.S. Eng.; James Lawrie, M.B. Edin.; Charles Roy Macdonald, M.B. Edin.; Donald Couper Mackenzie, M.B. Edin.; John Campbell Mackenzie, M.B. N.Z.; Alfred Ian Lennox Maitland, M.B. Glasg.; Ian Morison Orr, M.B. Glasg.; Llewelyn Courtenay Palmer-Jones, M.B. Edin.; Jack Polonsky, M.B. Liverp.; James Henry Gordon Robertson, M.B. Edin.; Brian Powell Robinson, M.R.C.S. Eng.; and Dorothy May Satur, M.B. Madras.

The following candidates received the higher dental diploma:—

Geoffrey Brocas Hunter, Reginald Edward Clarke, John Walter Shaw, and Horace Hayman Boyle.

University of Liverpool

The following awards have recently been made in the faculty of medicine:—

Gold medal for medicine, J. K. B. Waddington, proxime accessit: Margaret F. Procter; clinical school exhibition (clinical medicine), A. J. McCall; A. C. Rich prize (clinical medicine), E. W. Jones; gold medal for surgery, A. C. Brewer; Derby exhibition (clinical surgery), J. G. Sheldon; gold medal for obstetrics and gynæcology, A. J. McCall, proxime accessit: Margaret F. Procter; and Robert Gee prize (diseases of children), V. K. Drennan.

University of Dublin

The fourth series of the John Mallet Purser lectures will be delivered by Prof. C. U. Ariens Kappers, director of the Institute for Brain Research of Amsterdam, in the department of physiology of the medical school. On Tuesday, June 12th, he will speak on the differences in the effects of various sensations on the structure of the nervous system; and on Thursday, June 14th, on the so-called Semitic and Aryan peoples in the Near East. The lectures are open to the public and will be given at 5 P.M. each day.

Research Defence Society

The annual general meeting of this society will be held at the London School of Hygiene and Tropical Medicine, Keppel-street, London, W.C., on Tuesday, June 5th, at 3 P.M., when the eighth Stephen Paget memorial lecture will be delivered by Mr. Joseph Barcroft, F.R.S., professor of physiology in the University of Cambridge. His subject will be experiments on man. Lord Lamington, the president, will take the chair and he will be supported by Sir Arthur Stanley and Prof. A. V. Hill, respectively chairman and vice-chairman of committee.

Prof. F. E. Tylecote, F.R.C.P., has been placed on the commission of the peace for the city of Manchester.

South-West London Medical Society

The Bolingbroke lecture will be delivered to this society at the Bolingbroke Hospital, Bolingbroke-grove, Wandsworth Common, at 9 P.M., on Wednesday, June 6th, by Mr. Comyns Berkeley, who will speak on Some Things I have Learnt. The arrangements previously announced have been cancelled.

National Smoke Abatement Society

This society, whose president is Dr. H. A. Des Vœux, is arranging a symposium on smokeless open-grate fuels. The papers will be delivered at an open meeting to be held at 71, Eccleston-square, London, S.W. 1, on Friday, June 8th, at 11 A.M., and there will be a discussion. The address of the general secretary is 23, King-street, Manchester 2. The annual conference of the society will be held at Glasgow from Sept. 27th to 29th.

Glasgow Post-Graduate Medical Association

This association has arranged for a general medical and surgical course to be held from August 20th to Sept. 14th. The mornings will be occupied with general medicine and surgical diagnosis and minor surgery at the Royal Infirmary and the Victoria Infirmary, while the afternoons will be spent in studying special subjects. Clinical assistantships are also available in some of the institutions taking part in the work of the association. Further information may be had from the secretary of the association at the University, Glasgow.

Committee against Malnutrition

Under the auspices of this committee, whose aims were described in our issue of April 21st (p. 865), a public meeting will be held on Wednesday, June 13th, at 8 P.M., at 34, Red Lion-square, Southampton-row, London, W.C., to discuss "the steps to be taken in combating the widespread undernourishment of men, women, and children." Among the speakers will be Dr. Stella Churchill, Prof. J. B. S. Haldane, F.R.S., Dr. R. D. Lawrence, and Dr. R. A. Lyster. Tickets at 1*s.* each may be had from the hon. secretary, Mr. F. Le Gros Clark, at the headquarters of the committee, 19c, Eagle-street, W.C. 1.

Institute of Medical Psychology

A short course of lectures, on the Approach to the Psychoneuroses, for practitioners and medical students, will be held at the new premises of this institute, Malet-place, London, W.C., from June 18th to 29th. The lectures will be at 4.45, 5.45, and 8.15 P.M. daily, from Monday till Friday, and there will be demonstrations on Saturday, June 23rd, from 2.30–5 P.M. Further particulars may be had from the hon. lecture secretary at the institute.

University College Hospital

The report for 1933, the centenary year, shows a total of 8624 in-patients in the main (5542), the obstetric (1868), and the Royal Ear (1214) hospitals. There were 76,570 out-patients, 54,583 of whom attended the main hospital. The in-patients' average stay was 21·78 days, and their average statistical cost per head was £2 19*s.* 7*d.* There is "urgent need" for extending the child welfare and antenatal departments, and the provision of pay-beds "is hardly a less pressing necessity." A site in the near neighbourhood of the Obstetric Hospital is available for these extensions, which are estimated to cost £100,000. The policy of discouraging out-patient attendances for trivial complaints has reduced the number of general medical out-patients. In an endeavour to solve the problem of waiting in the out-patient departments, an intensive timing of patients from the time of arrival to the time of departure has been carried out in the main hospital over a period of three weeks, covering about 6000 cases. The returns show that, on an average, casualty patients are kept 1½ hours, old out-patients 1½ hours, and new out-patients (whose histories have to be taken) 2¾ hours. These periods of waiting are not regarded as excessive.

West London Hospital

The report for 1933 presented to the annual meeting last week states that the extensions to the hospital, costing about £32,000, are to be begun. Three old houses on the Hammersmith-road, forming the south-eastern frontage of the hospital, will be demolished, which will enable a new building to be erected on the site. It will contain a new casualty department, with operation theatre, and X ray department. The Earl of Athlone, who presided, said that it was unfortunate that the urgently needed pathological laboratory must be left out of the scheme for the present. The money in hand for the extensions now amounts to £27,000.

Bolingbroke Hospital, Wandsworth Common

In the report for 1933 the governors lay urgent emphasis upon the need for replacing the old "mansion part" of the hospital, at a cost that will exceed £60,000. The 2127 new in-patients remained 19·23 days each on the average, and cost £3 per head per week; the statistical cost of each occupied bed was £145 10s. 11d. Although the 13,537 new out-patients were an increase of 413, their attendances decreased by 1108. The new system of inquiring into the financial status of out-patients "has proved in every way satisfactory." The pathological laboratory was opened during the year, and has been used to its full capacity. There was a deficit of £1082, caused almost entirely by the cost of renovations.

Appointments

GIFFORD, J., M.B., Ch.B. Edin., has been appointed Medical Superintendent, Prestwich County Mental Hospital.

MACKAY, W., M.B., Ch.B. Glasg., Certifying Surgeon under the Factory and Workshop Acts for Strathdon, Aberdeenshire.

Vacancies

For further information refer to the advertisement columns

Ashton-under-Lyne, District Infirmary.—H.S. At rate of £150.
Bagdad, Royal College of Medicine.—Chair of Materia Medica.
Beckenham, Bethlem Royal Orchard, Monks Orchard.—Sen. Asst. Phys. £700.
Birmingham, Dudley-road Hospital.—Jun. M.O. At rate of £200.
Birmingham Maternity Hospital.—Res. M.O. and Reg. £200.
Brighton, Royal Sussex County Hospital.—H.S., and Cas. H.S. £150 and £120 respectively.
Burma, Rangoon Municipal Corporation.—Health Officer. Rs. 1300.
Burton-on-Trent, Derby Hall Orthopædic Hospital.—Locum Res. Asst. M.O. At rate of £350.
Burton-on-Trent General Infirmary.—Cas. O. and H.P. £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Cardiff, Welsh National School of Medicine.—Demonstrator in Materia Medica, &c. £50.
Charing Cross Hospital Institute of Pathology, W.C.—Part-time Bacteriologist and Hæmatologist. At rate of £250.
Chelsea Hospital for Women, Arthur-street, S.W.—Jun. H.S. At rate of £100.
Chesterfield, Walton Sanatorium.—Locum Res. Asst. M.O. At rate of £350.
Children's Hospital, Hampstead, N.W.—Res. M.O. At rate of £100.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Connaught Hospital, E.—Hon. Surgeon.
Dewsbury and District General Infirmary.—H.S. £150.
Dewsbury, Infectious Diseases Hospital.—Res. M.O. £200.
Dreadnought Hospital, Greenwich, S.E.—H.P. and H.S. At rate of £110.
Edinburgh Royal College of Physicians.—Kirk Duncannon Fellowship for Medical Research. £150–£200.
Evelina Hospital for Sick Children, Southwark, S.E.—H.P. At rate of £120.
Glasgow University.—Muirhead Chair of Medicine.
Gloucester, Gloucestershire Royal Infirmary, &c.—Res. H.P. and Res. H.S. Each at rate of £150.
Golden-square Throat, Nose and Ear Hospital, W.—Hon. Surgeon. Also Hon. Asst. Surgeon.
Great Yarmouth General Hospital.—H.S. £140.
Hastings, Royal East Sussex Hospital.—Temp. Asst. Pathologist. 7 gns. per week.
Hendon Isolation Hospital.—Res. M.O., &c. £500.
**Hospital for Consumption and Diseases of the Chest, Brompton, S.W.*—Asst. in Pathology Dept. £350.
Hospital for Sick Children, Great Ormond-street, W.C.—H.P. and H.S. Each at rate of £100. Also Physician to Skin Department.
Hull Municipal Maternity Home and Infants' Hospital.—Jun. Res. M.O. At rate of £100.
Hull Royal Infirmary.—Third H.S. At rate of £150.
Ilford, King George Hospital.—Cas. O. At rate of £130.
Kent and Canterbury Hospital.—H.S. At rate of £125.
Kingston and District Hospital.—Jun. Res. M.O. At rate of £250.
Lancashire C.C., School Medical and Child Welfare Dept.—M.O. £800.
L.C.C.—Radiologist. £1500.
Leeds Public Dispensary and Hospital.—Hon. Surgeon.
Lincoln County Hospital.—Sen. H.S. At rate of £250.
Liverpool University.—Jun. Lecturer in Pathology Dept. £300.
London Hospital, E.—Asst. Director of Med. Unit.
London University.—Chair of Obstetrics and Gynæcology. £2000.
Manchester Babies Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.
Manchester, Christie Hospital and Holt Radium Institute, Withington.—Res. M.O. At rate of £150.
Manchester Northern Hospital for Women and Children, Parkplace.—Jun. H.S. £100.
Manchester Royal Children's Hospital.—Asst. Surgeon. £50.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Northwood, Mount Vernon Hospital.—H.S. £150.
Norwich, Norfolk and Norwich Hospital.—H.P., H.S., and H.S. to Spec. Depts. Each £120.
Preston County Borough.—Asst. School M.O. £500.
Princess Beatrice Hospital, Earl's-court, S.W.—Clin. Asst. to X Ray Dept.
Princess Louise Kensington Hospital for Children, St. Quintin-avenue, N. Kensington, W.—H.P., and H.S. Each at rate of £100.
Queen Mary's Hospital for the East End, E.—Cas. O. At rate of £150. Also Two H.S.'s, H.P., Obstet. H.S., Res. Anæsthetist, and H.P. Each at rate of £120.
Queen's Hospital for Children, Hackney, E.—H.P. and Cas. O. Each at rate of £100.
R.A.M.C.—Commissions.
Rotherham Hospital.—H.P. £180.
Royal Free Hospital, Grays Inn-road, W.C.—Res. Cas. O. At rate of £150. Res. Asst. Path. At rate of £75. Also H.S. for Ear, Nose, and Throat Beds, and Res. Anæsthetist.
Royal London Ophthalmic Hospital, City-road, E.C.—Hon. Asst. Phys.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Hon. Clin. Asst.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—Res. Surg. O. At rate of £150.
St. Thomas's Hospital, S.E.—Chief Asst. to Dental Dept.
Salvation Army, Mothers' Hospital, Lower Clapton-road, E.—Jun. Res. M.O. At rate of £80.
Sheffield, Jessop Hospital for Women.—Two H.S.'s. Each at rate of £100.
Shrewsbury Eye, Ear, and Throat Hospital.—H.S. At rate of £225.
Southend-on-Sea General Hospital.—H.S. At rate of £100.
Swansea County Borough, Mental Hospital.—H.P. At rate of £100.
West End Hospital for Nervous Diseases, Gloucester Gate, N.W.—Hon. Asst. Radiologist.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Jun. Res. H.S. At rate of £100.
West London Hospital, Hammersmith-road, W.—H.P., H.S., and Res. Anæsthetist. Each at rate of £100.
Wolverhampton Royal Hospital.—H.S. for Ear, Throat, and Nose Dept. At rate of £100.
Worksop, Victoria Hospital.—H.S. At rate of £170.
York County Hospital.—Res. Anæsthetist and Asst. H.S. £150.

* In our advertisement columns last week (p. 50) the date of the meeting of the Medical Committee of the Hospital for Consumption and Diseases of the Chest was inadvertently announced as June 30th. It is given correctly as June 20th in the advertisement appearing on p. 53 of our present issue.

Births, Marriages, and Deaths

BIRTHS

JOHNSON.—On May 15th, at Linden House, Romsey, Hants, the wife of Dr. G. H. Johnson, of a son.

MARRIAGES

NEALE—SHARP.—On May 15th, at All Souls Church, Langham-place, London, Albert Ezra Neale, M.D., of Holland Park, to Vivien Irene, widow of Harold Sharp, of Northgate, Warwick.

DEATHS

BARRS.—On May 12th at Wanstead, E.11, John Harry Barrs, F.R.C.S.I., Senior Surgeon of Connaught Hospital, Walthamstow, in his sixty-ninth year.

BUCKLEY.—On May 15th, at Grosvenor-mansions, Buxton, George Granville Buckley, M.D., late of Bury, aged 56.

SUTCLIFFE.—On May 9th, at Hill House, Tywardreath, William Sutcliffe, M.R.C.S., L.R.C.P. Lond.

TAYLOR.—On May 15th, at Park-circus, Glasgow, after a long illness, James Taylor, F.R.C.S. Edin.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

LEFT-HANDEDNESS

SOME OF ITS ASSOCIATIONS

By CHARLES J. MACALISTER, M.D. Edin., F.R.C.P. Lond.

CONSULTING PHYSICIAN TO THE LIVERPOOL ROYAL SOUTHERN HOSPITAL AND TO THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL

IN 1642 Sir Thomas Browne discussing in his Religio Medici the doubts which have been cast upon certain Biblical statements by various authors confesses that he has perused them all and can discover nothing that may startle a discreet belief. Among these he says: "Whether Eve was framed out of the left side of Adam I dispute not because I stand not yet assured which is the right side of a man and whether there be any such distinction in nature." By far the largest number of left-handed people are perfectly normal physiologically, but there are abnormalities depending upon transposed, or to speak more correctly, imperfectly transposed function.

So far as we know all the lower animals are ambidextrous, and it is interesting to note that children up to the age of about two years also appear to use either hand indiscriminately. This is so marked that mothers get into the way of correcting their children by making them use the right hand when they manipulate with the left one, this educative factor being one of the popular explanations of the perpetuation of right-handedness.

The Origins of Right-handedness

That right-handedness is hereditary there can be no doubt, but how that characteristic was originally acquired is very difficult to explain, and as in the case of all unexplained problems, the number of theories which have been advanced is very considerable. I need not enumerate all of these, and many of them are far fetched and fantastic. One of the most popular arose from the impression of early man that in mortal combat wounds of the left chest were liable to be more fatal than those of the right, giving rise to the protection of the left side by a shield on the left arm, the right one thus becoming developed as a sword-arm.

Various observers have indicated that the left side of the brain develops somewhat earlier than the right one, and that the right side of the body therefore becomes earlier and more emphatically used owing to a greater supply of nerve force to its muscles, and that corresponding with this would come the earlier specialisation of the speech motor apparatus in the left Brocal convolutions.

Another suggestion put forward in the past was that the trend towards dextrality synchronised more or less with the development of writing by signs, and that it is just possible that a sign language preceded a spoken one. In this connexion it is interesting to remember that the natural sign language of the deaf and dumb must date from very ancient times. The real interest in it depends on its universality, a fact which was noted by George Dalgarno, an Aberdonian, who was headmaster of Elizabeth School, Guernsey, and later for many years at Oxford. Dalgarno in 1664 suggested that advantage should be taken of this fact to utilise it as a universal language, and he wrote a book on the subject entitled "Ars Signorum Vulgo Character Universalis."

Whatsoever the explanations of right- or left-handedness may be in the processes of evolution, there can be no doubt that they are hereditary; the great dominance of the inheritance being a right-handed one, and the distinctive features of this have led to each hand having its peculiar functions. The use of the knife in the right hand and the fork in the left one illustrates this, and also the specialised functions of the right and left hands in playing the violin, for instance, and other bimanual requirements. Notwithstanding this, the idea still exists that everybody ought to be ambidexter, or capable of being educated to be so, and on this basis the Ambidextral Culture Society was constituted. Its members believe that man, having originally been ambidextrous, and there being no anatomical or physiological reason for his being otherwise, one-handedness was simply an acquirement capable of being balanced and corrected. At one time, within my own recollection, this society was very active, but our knowledge of the functions of the brain, and more especially of the unilateral situation of the speech centre, has led to a dismissal of the suggestion that equi-handedness or equi-brainedness will ever become re-established, if it ever existed.

The Dominance of Right-handedness

All nations without exception have a dominance of right-handedness. Of the relative frequency of left-handedness in various nations I have no statistics, but in our own country the proportion ranges from 5 per cent. to 8 per cent., and there is reason for believing that in small communities it may be somewhat higher owing to the intermarriage of the people. Dr. W.W. Ireland in "Brain," 1880-81, vol. iii., p. 207, recorded some figures obtained from a teacher of the Sessional School at Larbert, where Ireland was superintendent from 1869 to 1879 of the Scottish National Institution for Imbecile Children. He estimated that among normal children in his district about 12 per cent. were left-handed. This is a much higher figure than maintains in the Liverpool council schools, in which I investigated the matter in 1920, and is probably related to the parochial population of a small place like Larbert where hereditary characteristics would tend to be amplified.

I recollect to have discussed with the late Prof. Thomas Glynn the reputed prevalence of left-handedness among criminals. I am not convinced that this has ever been confirmed, but in an article by C. Lombroso, in the *North American Review*, vol. v., p. 440, on left-handedness he stated that the percentage in this class was much higher than that in the normal population—viz., 13 per cent. among men and 22 per cent. in women, as compared with the 7 per cent. in men and 5 per cent. to 8 per cent. in women, in a total of 1029 normal members of society. However this may be, we certainly cannot infer from experience that the majority of left-handed people have a wicked strain in them, though it is interesting to recollect that the conventional use of the word "sinister" originated from a reputed association of the kind, and Lombroso mentioned that the people of Lombardy and Tuscany speak of an untrustworthy person as being left-handed. When left-handedness is inherited there can be no doubt that the large preponderance of right-handed people renders it extremely unlikely that the production of a pure left-handed strain is probable. An outcrop of left-handedness in a family is probably Mendelian in origin, owing to the union of hybrid individuals both having, say, a dominant right-handed inheritance with a repressed left-handed one. Where a definitely left-handed individual marries a right-handed hybrid possessing a repressed left-handed strain, the likelihood of there being left-handed progeny would of course be amplified.

Left-handedness and Transposition of the Viscera

It might be thought that complete transposition of the viscera would in every case be associated with a right-sided speech centre, but curiously this is not the case, there being a good many records of this condition where there has been right-handedness, although the majority of them have been left-handed.

M. Cachet, quoted by Pye-Smith in Guy's Hospital Reports, 1870, describes a case of transposition in a young woman who was right-handed during life; another case was recorded by M. Gery, and a third by Dr. B. S. Schultz; and in a case of a complete transposition recorded by Pye-Smith himself he had ascertained that the subject of the abnormality had been right-handed during life. These cases of course would be the equivalents of left-handedness in normal individuals. But left-handed people in a certain number of cases have undoubtedly left-sided speech centres, it being apparently unnecessary to have the speech centres transposed, although the dominant motor centres for the arm and leg are in the right hemisphere. This has been adverted to by many clinical observers who have commented on the fact that, in the majority of cases where left-handed people are the subject of apoplexy, giving rise to left hemiplegia, there is accompanying aphasia; and there have been instances where the hæmorrhage has been shown to involve the speech motor area in the right brain without interference with speech, thereby indicating that the speech centre had not been transposed. Bearing upon this there was an important paper in the *American Journal of Medical Sciences*,[1] written by Dr. Foster Kennedy, which deals with the causation of aphasia. This was a criticism of a paper by Pierre Marie and his colleague Moutier, written in 1908: "La théorie de la gaucherie cérébrale, pleine d'obscurities, contradite par les faits, ne peut servir à expliquer pour les partisans du centre de Broca les destructions de ce centre sans aphasie." This conviction arose from the circumstance that notwithstanding the indubitable evidence that in right-handed persons the speech centre is in the left Broca's area, there are certainly cases freely cited by Moutier of "right-handed right hemiplegics without aphasia, and also cases of left-handed left hemiplegics without any disturbance of their powers of conversation." The author's comment is that "these cases only impugn the theory of constant conjunction in any one subject of right-brainedness and left-handedness, or of left-brainedness and right-handedness." He suggests that the simple statement that a patient is right-handed is not adequate in some of the cases which he recalls, and he lays stress upon the necessity for investigating the question not only of a patient's handedness, but also of the prevailing type of handedness in his stock, which, as he states, throws some light on a very obscure chapter of neurological medicine. I freely quote his observations on this point:

His *first* case was one of a massive bomb injury to the right speech area and occipital lobes in a left-handed man without left-handed relatives or ancestry, and there was no aphasia. He never had any difficulty with speech. He was a man who was left-handed to an extreme degree. He reversed the usual position of the knife and fork, and, while he wrote with the right hand, he was equally able to do so with the left. The injury sustained was extensive, and with X rays the fragments of the grenade and of the driven bone were seen to have been flung through the cortex and embedded in the right occipital pole; if the speech centre had been in its normal position there should have been distinct disorder of that function.

His *second* case was one of a left-handed man, aged 36, suffering from embolic right-sided paralysis and aphasia, showing that the speech centre was in the left hemisphere. None of his near relatives or ancestors was known to be left-handed. Kennedy pointed to the fact that he was isolated as a left-handed person in a stock entirely right-handed.

A *third* case quoted was a completely left-handed man who had sustained a fracture involving the right speech area, with right middle meningeal hæmorrhage. Craniectomy had been performed, a bone injury of two by four inches having been made over the affected areas. There had been left hemiplegia which had recovered, but he occasionally suffered from severe left-sided convulsions. Despite his left-handedness, which was complete, except for writing, there had never been the slightest interference with the function of speech. This patient's relatives were all right-handed. He had lived, as had the first case recorded, as a member of a village community, in which in both instances were included many of their relatives. Each man was quite positive that he was the only left-handed member of the stock.

Another series of cases recorded by Kennedy is of right-handed individuals showing similar peculiar results from similar cerebral catastrophes. For instance, a right-handed girl suffering from severe Jacksonian convulsions confined to the left side of the body always followed by severe transient left hemiplegia with equally severe transient aphasia. The patient, herself right-handed, had a left-handed father and a left-handed mother. Another case was a young man suffering from right-sided subcortical Rolandic glioma, for which was performed a right subtemporal decompression. He had complete aphasia for ten days following the operation. He himself was right-handed, but he had two brothers both of whom were left-handed. Another case was that of a woman, aged 67, suffering from a cerebral hæmorrhage resulting in left hemiplegia and a considerable degree of sensory motor aphasia. She was right-handed, but her mother had been left-handed. She had a left-handed brother and a left-handed daughter.

Stammering

Bearing in mind these anatomical and physiological facts, and the Mendelian explanation of inherited left-handedness, I think we may be in a position to throw some light on the explanation of stammering, and some other conditions of muscular incoördination which have dawned as the outcome of clinical experience. The stammering associated with left-handedness has been the subject of recent correspondence in the lay press. Looking back one can recollect a considerable number of instances where this defect of speech has been transmitted by inheritance, sometimes in right-handed people as well as left-handed ones. In the former probably it is the result of a repressed left-handed strain, and in the latter of a repressed right-handed one, and in this connexion a study of the transposition of the speech centres in left-handed people is significant.

Right-handedness or left-handedness must be regarded as a kind of inherited physiological incoördination of function in which some specialisation has been acquired by one cerebral hemisphere as compared with the other, and it is from a study of such specialisation that we must try to elucidate the upsets which result in stammering and some other gross muscular ataxias. Hughlings Jackson in his writings on the speech centres directed attention to the very interesting barrel-organ expressions commonly observed in cases of aphasic hemiplegics, and he pointed out that these utterances often refer to the thought or verbal expression of the patient at the very commencement of the hæmorrhage. He instanced a case of a railway signalman who was struck down by an apoplexy when walking from his signal-box to the railway platform, along a line on which he knew that a train would presently pass. From the time of his stroke, although aphasic, he repeated over and over again the words, "I want protection." In my own experience a friend who was suddenly overwhelmed with an apoplexy of the left brain repeated over and over again the words, "I want some brandy," almost until the time of his death. These kinds of expressions, according to Hughlings Jackson, represent the last call of the patient before the destruction or putting out of action of the speech centre in the left Broca area. He advanced the explanation that although speech is initiated in the left centre, the corresponding centre in the right brain acts as an automatic one which,

[1] "Stock Brainedness, the Causative Factor in the So-called "Crossed Aphasias." Foster Kennedy, M.D., F.R.S. Edin., Amer. Jour. Med. Sci., 1916, p. 823.

having picked up the message from its neighbour, pours it forth in the barrel-organ way described. Hughlings Jackson, from these observations, styled the left speech centre as the leading one and the right as an automatic one.

May not all this throw some light on the relative functions of the two centres and help us in our explanation of stammering and some other grosser abnormalities? May not stammering of this type be due to an imperfect transposition of function in the centres of the two sides of the brain? If so, one can imagine that in a left-handed stammerer whose leading speech centre would be in the right brain there may be a recessed leading centre in the left brain, and also perhaps some imperfect transposition of the automatic centres, and that the stammering might result from a confusion of function on the two sides.

Cases of Congenital Aphasia

Bearing on this come those interesting cases of congenital aphasia, unassociated with any deafness, of which three have been under my personal observation. The *first* of these was a big well-developed girl of 13 who had never spoken properly, who was practically aphasic. At 3 years of age she was thought to say "Mama" and "Dada," and subsequently learned to say a few words imperfectly, but her real language was almost entirely composed of signs and gesticulations similar to those natural ones used by the deaf. She was an absolutely left-handed child of right-handed parents, but her maternal grandfather was left-handed. When she was developing, the left breast developed considerably before the right one. She was quite intelligent and had a wonderful memory. It was evident that she could not use her speech centres, and one speculates as to whether this marked incoördination was not related in some way to the right centre being unbalanced by some unusual development of function of the left one, thus giving rise to confusion of coördination. The *second* case was a child of 6 who, although aphasic, was absolutely bright and quite up to the standard of intelligence for her age; she was also left-handed and presented a collateral sinistral history. Although unable to speak she could hum tunes and try to sing without words. The *third* case was a boy, aged about 3, who had never spoken. He was right-handed, but came of a distinctly left-handed stock on the maternal side; the mother's brother and sister and his mother all being left-handed.

Fright Choreas: Epilepsy

I have had several cases of left-handed children who only began to stammer when an attempt was made to convert them into right-hand writers owing to confusion of the right and left centres. This leads me to mention another very interesting series of cases which, although clinically choreas, really represent a gross muscular ataxia. I refer to the so-called fright choreas. In looking over my records I find that I have notes of cases, of which 13 were right-handed, 15 left-handed, and 5 were markedly ambidexters. Every one of these cases presented an ancestral history of left-handedness. That is to say, that the tendency towards left-handedness in the case of the right-handed, and towards right-handedness in the case of the left-handed children, led to confusion of coördination resulting from partial or repressed transposition of the cerebral function; this had given no trouble until the upsetting of the balance had been brought about by fright or emotional causes. It is on these lines that I venture to suggest that we have the explanation of stammering, in its relation to left-handedness. There are, of course, types of stammering due to functional causes, unassociated with any history of left-handedness. These must not be confused with the cases to which I have referred.[1]

[1] These cases and clinical experiences were referred to at a meeting of the Association of Physicians of Great Britain and Ireland at Edinburgh in 1923, and in an article on a Classification of Chorea in Relation to its Causes, Brit. Med. Jour., Nov. 8th, 1924.

Physiological incoördination appertaining to handedness refers not only to the general motor system, but it has another curious association. There is normally a strong side and a weak side to the body, and this does not apply only to physical strength and dexterity, for it has a bearing upon vitality and upon susceptibility to disease. In a paper on Education and Coördination of Function[2] I pointed out that most deformities, such as club-foot and other malformations, are on the weaker left side, and so are a number of acquired diseases. I have over and over again demonstrated the fact that in right-handed children chronic fibroid bronchiectasis is almost invariably initiated on the left side, whereas its position is reversed when the patient is left-handed. At a meeting of the Association of Physicians of Great Britain and Ireland some years ago during a demonstration of a case of right-sided bronchiectasis, I remarked to the demonstrator, "Surely this boy must be left-handed, for I have seldom seen such a one in an ordinary right-handed person," and my conjecture turned out perfectly correct.

Ireland, whom I have already quoted, says left-handedness is not only common in epilepsy, but it is also more pronounced in this disease than in any other form of mental affliction, and Trousseau has remarked ("Clinical Medicine," Paris, 1868, vol. ii., p. 668), that the right and left sides are subject to different diseases; neuralgia, for instance, is more common on the left side of the chest than the right, and I have noted that chilblains and atrophy of the nails in cold weather are often more marked on the left hands than on the right. Wherefore this selective tendency for disease to attack the left side? It must be related to the greater vitality and strength of the right side. It has been suggested that the stronger right side is brought about by its having a more direct blood-supply than the left, but it is to be remembered that the supply to the right side of the brain is also more direct than it is to the left side, which rather annuls that theory. I have no explanation to offer unless it be that a lesser resistance on the weaker side has to do with the matter.

Conclusion

In conclusion I may just refer to some of the physical characteristics of left-handedness which are sometimes quite obvious. There is a degree of asymmetry, or, as it is often termed, hemiatrophia, in most people, the right side of the face and the right chest being rather more developed corresponding with the greater size and strength of the limbs. This muscular predominance is further observable in facial expression, the stronger side often acting a little more quickly or emphatically than the weaker, so that during smiling the angle of the mouth gets more elevated on the one side than on the other, and one eyebrow perhaps raises a little more than its neighbour. This asymmetry, together with the slightly larger orbit which is occasionally observable due to greater muscular tonicity, is not without its attractiveness. It gives rise to archness of expression which is a point in beauty. These characteristics are all transposed in the left-handed. Occasionally there is a greater growth of hair on the trunk of sinistral people on the left than on the right side, and regarding the hair of the head, it is sometimes easy to spot a left-hander because he parts his hair on the right and brushes it over to the left. When examining recruits during the war I frequently observed that, whereas the left testicle is the lower in a right-handed man, it is the higher in a left-handed one.

The subject of left-handedness and of the various conditions associated with it have interested me for many years, and the substance of this paper has been referred to in clinical and post-graduate lectures on several occasions.

[2] Some Relationships between Education and Coördination of Function. Presidential Address to Liverpool Biological Society, 1914. Transactions, 1914, vol. xxviii.

THE LA TOJA SPA

THE island of La Toja, off the north coast of Spain, is well known for its copious hot salt springs (140° F.), which are used internally and externally for a variety of complaints. The water, besides the chlorides of sodium, calcium, and magnesium, contains a large proportion of iron and some bromide, arsenic, and silicates. Its composition makes it suitable for catarrhal dyspepsia and constipation and obesity, whilst the baths and natural muds are advised for chronic rheumatic, inflammatory, and exudative diseases of various kinds.

The opening of an installation in connexion with this spa at Sunderland House, Curzon-street, London, was announced recently in our columns. A visit to the installation by a specialist in spa therapeutics has resulted in the following note: "The natural salts and salt muds have been extracted from the source. The salts are prescribed internally in appropriate doses and for nasal douches, gargles, and inhalations. The baths are prepared from the salt iron mud and given usually with massage principally for rheumatic and skin affections. The effect is pleasant and stimulating to the skin and circulation. A medicinal soap and ointment have also been prepared from the La Toja waters, as well as a variety of toilet preparations. Whilst it cannot be expected that these preparations can reproduce the effects of the water in the fresh state, the baths should be of definite medical value in appropriate cases."

SANATORIUMS AND PUBLIC-HOUSES

THE report for 1933 of the Aargau group of sanatoriums makes it clear that the public-house is regarded in Switzerland as an inconvenient neighbour to a sanatorium. Previous reports have discussed the difficulties and their possible solution, and this report states that the governing body of the canton of Solothurn by resolution deprived the mountain inn Saalhöhe of its licence from Jan. 31st last because the licensee had not fulfilled an instruction to refrain from serving the sanatorium patients. It was left open to the licensee to carry on as a coffee-house from Feb. 1st, but even this permission is to be withdrawn should he continue to serve customers who can be recognised as sanatorium patients. Similarly, the inns Balmis and Barmel, which retain their licence, have to undertake not to serve sanatorium patients recognisable as such. The canton has refused an application for a licence to an inn at Breitmies. Their attitude to this question is not guided simply by regard for the sanatorium patients, but also for the other guests from the use of the same glass and crockery, the danger of infection not being met by the usual washing-up, unless supplemented by formal disinfection.

WHITFIELD STREET MOTHERS' CLINIC

Lord Moynihan has put his name to the first public appeal ever made on behalf of the Mothers' Clinic in Whitfield Street, Tottenham Court-road, London. First opened in Spring 1921, over 20,000 women have attended, and affiliated clinics are at work so far away as South Africa. Medical practitioners of many nationalities have visited the clinic and shown their appreciation of the teaching demonstrations given there.

EMPLOYMENT OF SURPLUS MILK.—Mr. JOHN CAMPBELL, Ph.D., writes to advocate the use of some of the surplus milk in bread-making. In Germany, he says, bakers are obliged to add at least 5 per cent. of milk to the dough, and in the U.S.A. and Canada powdered milk is used largely for the same purpose. Dr. Campbell does not suggest that the use of milk in bread-making could possibly replace the consumption of whole liquid milk in the school dietary, but he does think that in a pressing agricultural problem of this kind all possible fields of absorption should be exploited. The addition to white bread of milk even in small proportion would secure a proportion of high-quality proteins and phosphates at every meal and on every day.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, May 28th.

Odontology. 8 P.M. Annual General Meeting at the Royal College of Surgeons, Lincoln's Inn-fields, W.C. Sir Frank Colyer will show specimens received in the Museum during the past year.

TUESDAY.

Pathology. 5 P.M. Summer Meeting at Mill Hill. Imperial Cancer Research Fund, Stroud Laboratory: Demonstrations by W. Cramer, L. Foulds, E. S. Horning, R. J. Ludford, E. Vazquez-Lopez (Madrid), A. F. Watson, and A. F. Watson and M. Mitols. National Institute for Medical Research, Rhodes Farm: Demonstrations by G. W. Dunkin, J. McIntosh, and W. E. Gye and W. J. Purdy.

FRIDAY, June 1st.

Radiology. 7 P.M. Annual General Meeting.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY, May 31st.—5 P.M., Annual General Meeting. Mr. H. A. Edgerton: Measurement of X Ray Quality by a Photographic Method. Mr. A. J. Minns: The Technical Aspects of Short Wave Therapy.

FRIDAY, June 1st.—Medical Meeting. 11 A.M., Visit to Cancer Hospital, Fulham-road, S.W. 5 P.M., Discussion of Cases. Dr. J. V. Sparks will give a short communication on Radiographic Demonstration of Calcification in Cardiac Valves.

A series of paper films by Dr. Sparks, with special reference to chest cases, will be on view at the B.I.R. on Thursday and Friday.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 28th, to SUNDAY, June 3rd.—MAUDSLEY HOSPITAL, Denmark-hill, S.E. Course in Psychological Medicine; afternoons.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology; afternoons.—CITY OF LONDON HOSPITAL, Victoria Park, E. Course in Chest Diseases; all day.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Course in Gynæcology; all day.—LONDON LOCK HOSPITAL; 91, Dean-street, W. Course in Venereal Disease, afternoons.—ST. MARY'S HOSPITAL, Plaistow, E. Week-end Course in Medicine and Surgery; all day, Sat. and Sund.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture on Functional Heart Disease, at 2.30 P.M. on Tues., by Dr. A. E. Clark-Kennedy.—LECTURE HALL, Manson House, 26, Portland-place, W. Debate on the motion "that in the absence of complications surgical interference in cases of gastric and duodenal ulcer is unnecessary." Principal speakers: Dr. A. F. Hurst and Mr. Mortimer Woolf for the motion, and Dr. Robert Hutchison and Mr. Herbert Paterson against the motion. Lord Moynihan of Leeds will take the chair. Wed., 8.30 P.M. (Open to all members of the medical profession.)

KING'S COLLEGE HOSPITAL, Denmark Hill, S.E.

THURSDAY, May 31st.—4.30 P.M., Dr. Allen Daley: Public Agencies which exist for the Prevention of Disease.

ST. PAUL'S HOSPITAL, Endell-street, W.C.

WEDNESDAY, May 30th.—4.30 P.M., Dr. T. Jenner Hoskin: The Cardiac Factor in the Choice of Anæsthetics.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

MONDAY, May 28th.—5 P.M., Dr. M. Sydney Thomson: Common Skin Diseases in Childhood.

WEDNESDAY.—5 P.M., Dr. J. A. Drake: Animal Parasites.

THURSDAY.—5 P.M., Dr. A. C. Roxburgh: Differential Diagnosis of some Common Skin Diseases.

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY AND RESEARCH, Paddington, W.

THURSDAY, May 31st.—5 P.M., Dr. Leonard Colebrook: Control of Streptococcus Pyogenes Infections.

CHADWICK PUBLIC LECTURES.

TUESDAY, May 29th.—5.30 P.M. (at the Royal United Service Institution, Whitehall, S.W.), Dr. J. B. Orr: National Food-supply and Public Health.

UNIVERSITY OF BIRMINGHAM.

TUESDAY, May 29th.—3.30 to 5 P.M. (at the General Hospital), Prof. K. Douglas Wilkinson: Use of Hypnotics.

FRIDAY, June 1st.—3.30 to 5 P.M., Dr. C. C. W. Maguire: Manifestations and Treatment of Arterio-sclerosis.

LEEDS GENERAL INFIRMARY.

TUESDAY, May 29th.—3.30 P.M., Mr. Broomhead: Backache.

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, May 30th.—4.15 P.M. (at the Eye Infirmary), Dr. J. Marshall and Dr. J. B. Stewart: Eye Cases.